

(A)

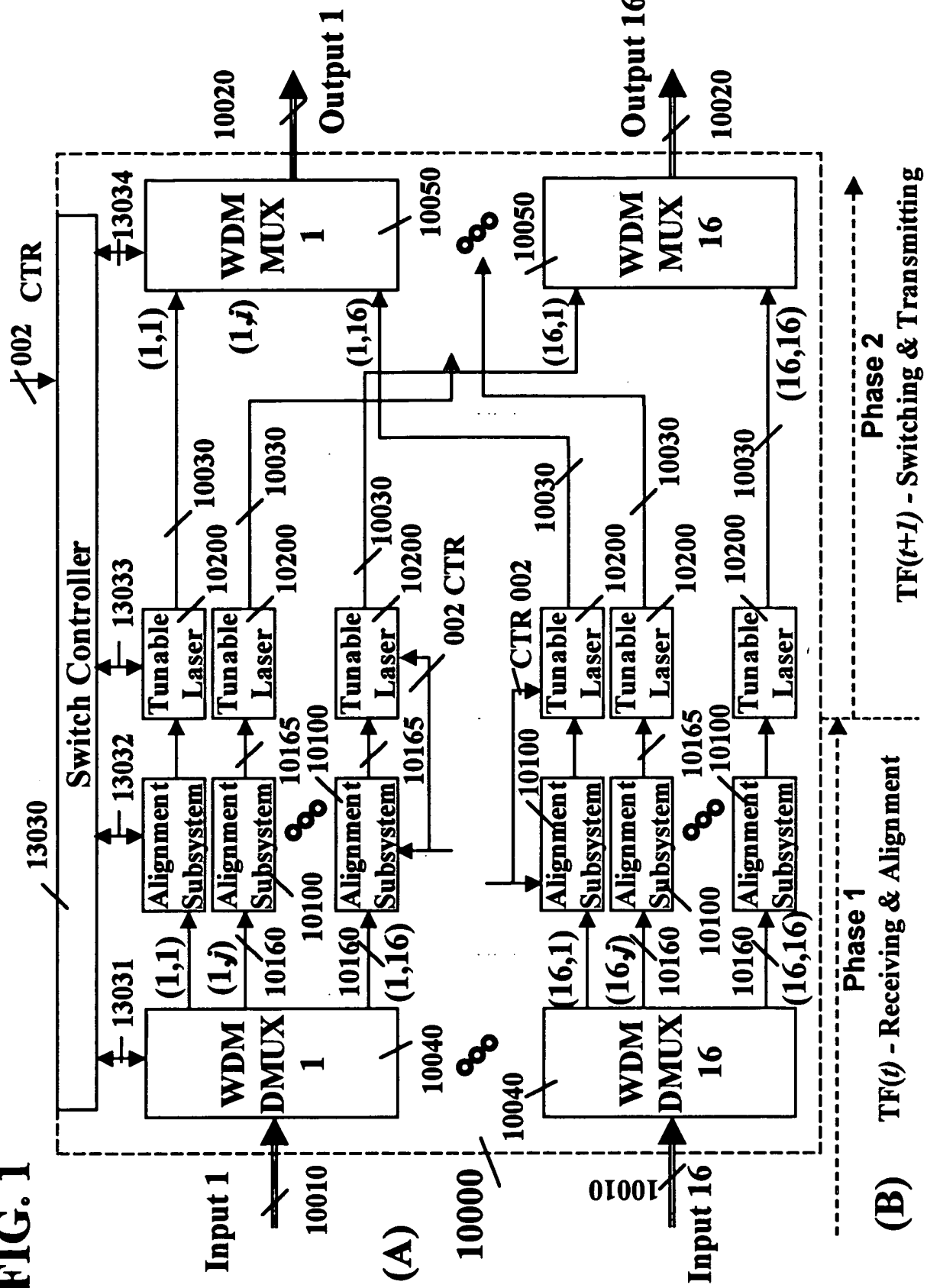


FIG. 2

Example:

TF1=15.325 microseconds - High_capacity = OC-192

TF2 = 125 microseconds - Low_capacity = OC-3

$\Rightarrow c = 64 = (OC-192/OC-3)$

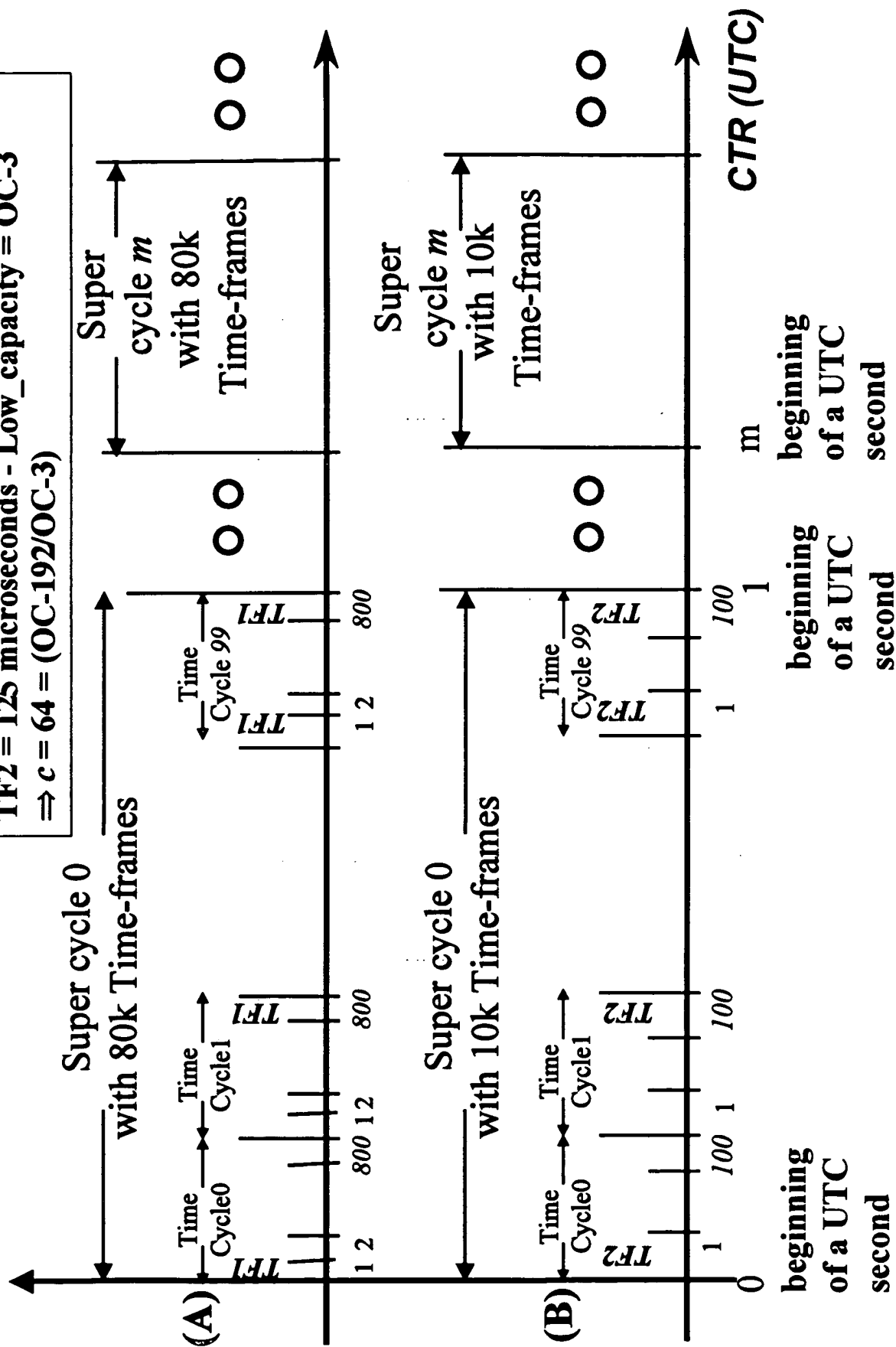


FIG. 3

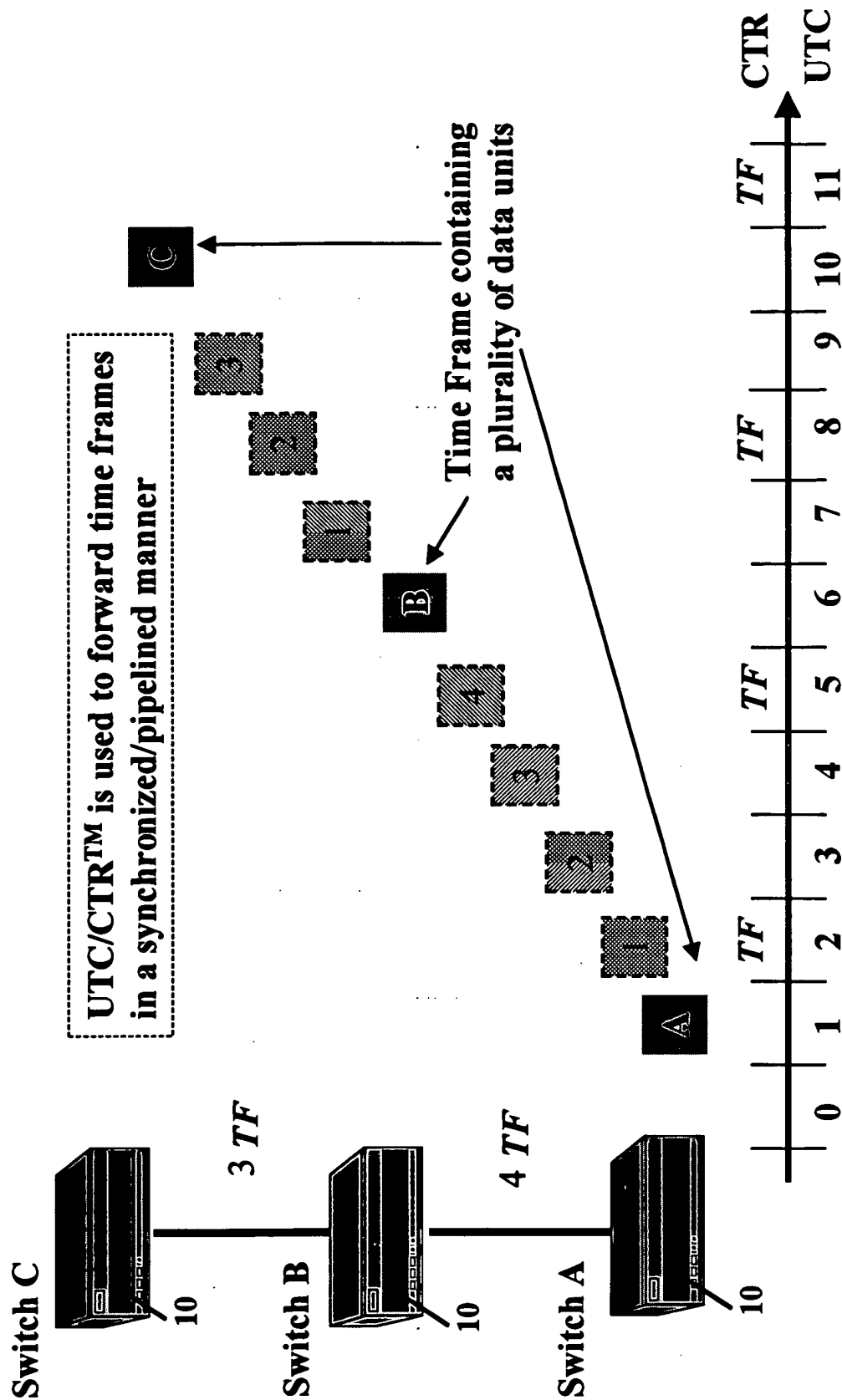
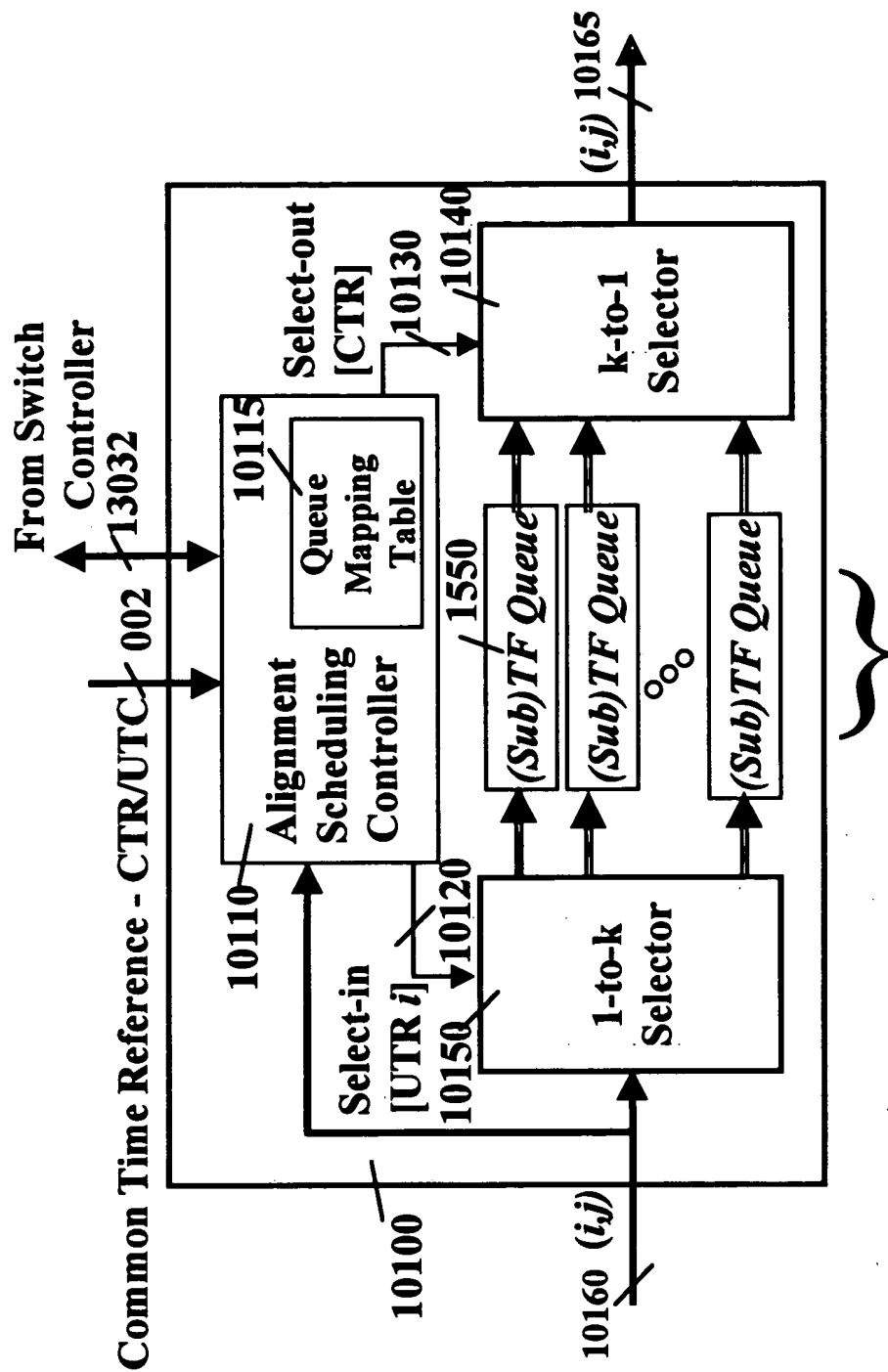


FIG. 4



Alignment Subsystem for high capacity Channel j at Input Interface i with a Plurality of Sub-Time Frame Queues

$TF_i j$: Time frame duration on channel j at Input Interface i .
 UTR_i : UTR on link connected to Input Interface i

FIG. 5

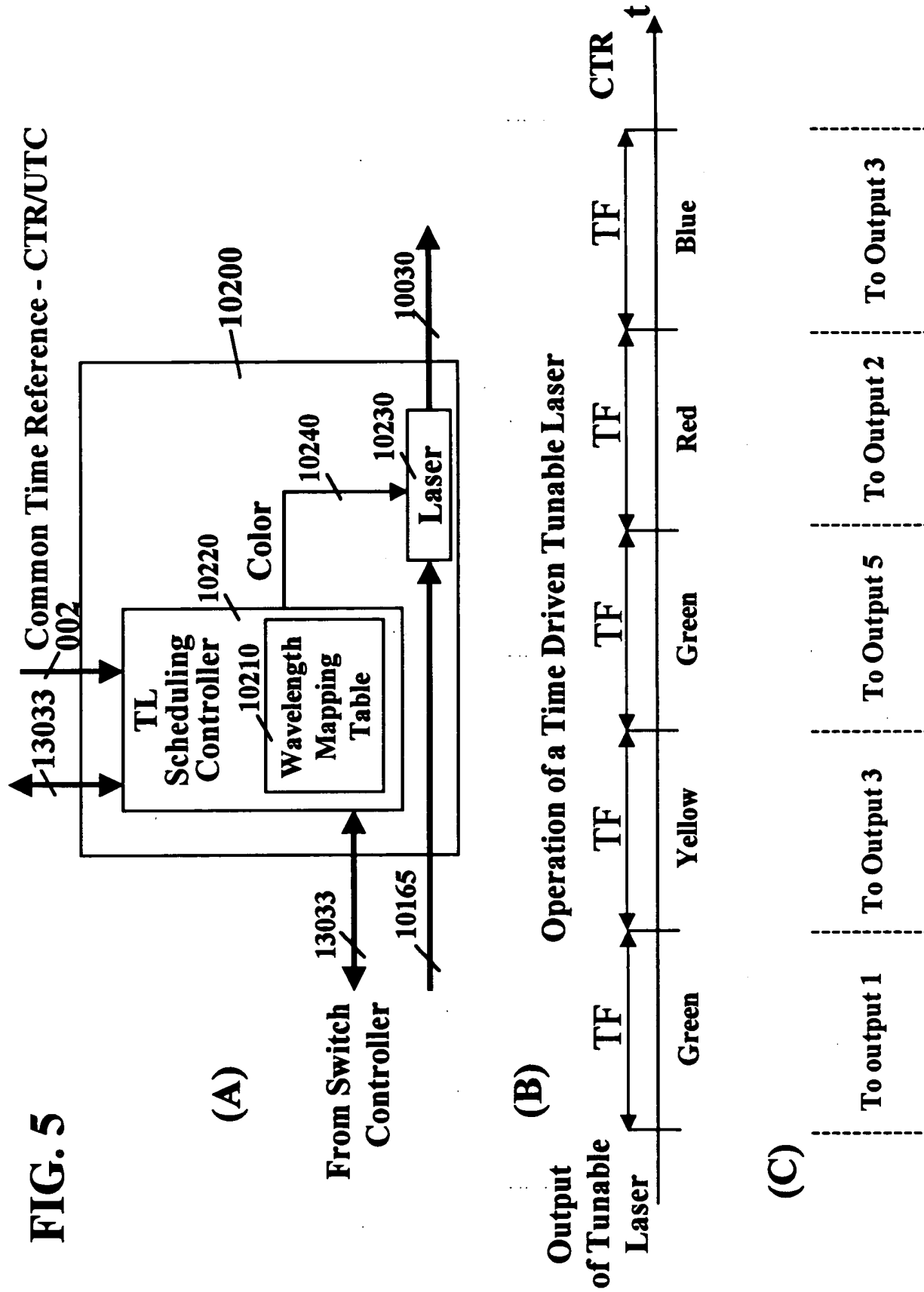


FIG. 6

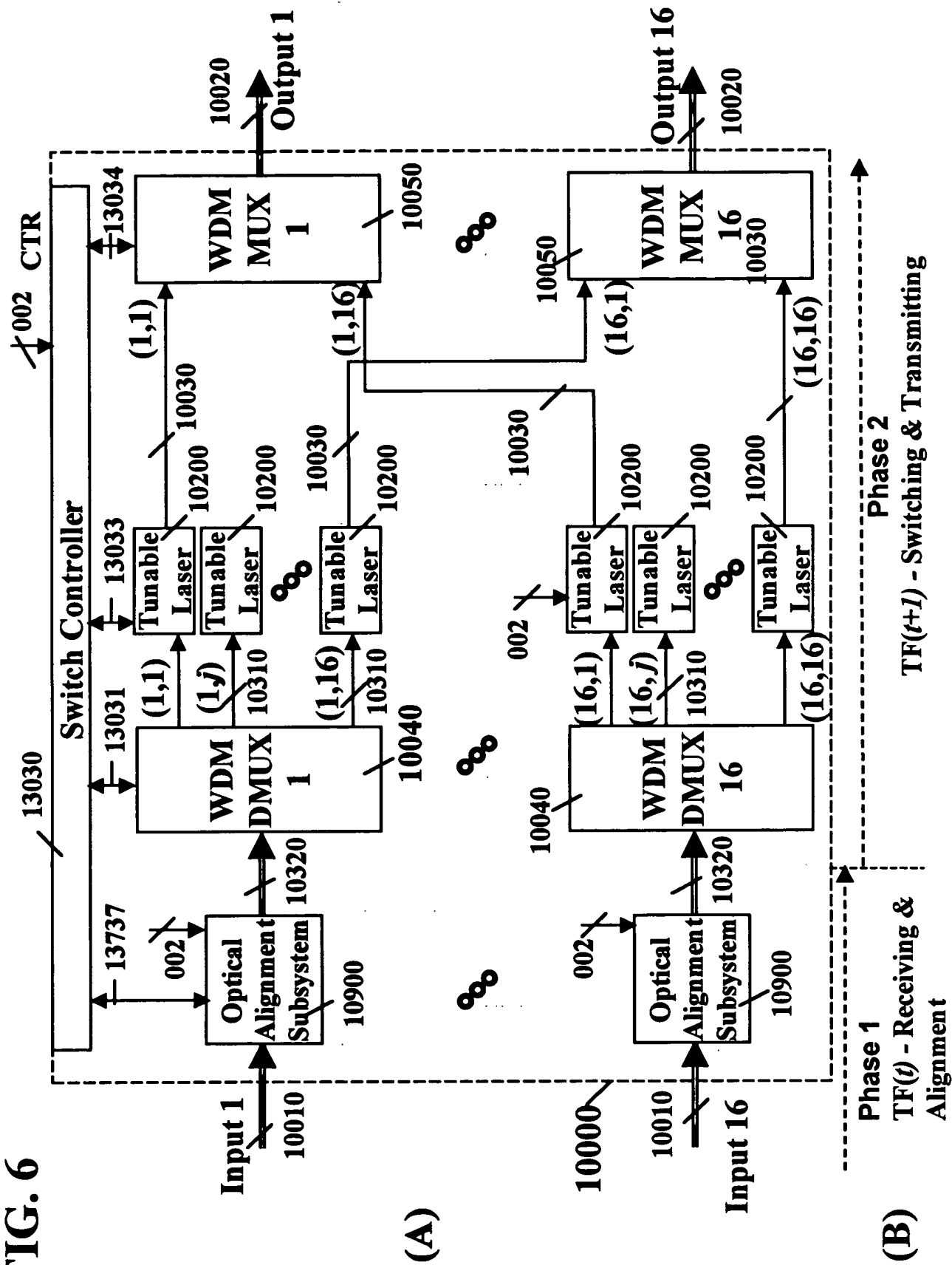


FIG. 7

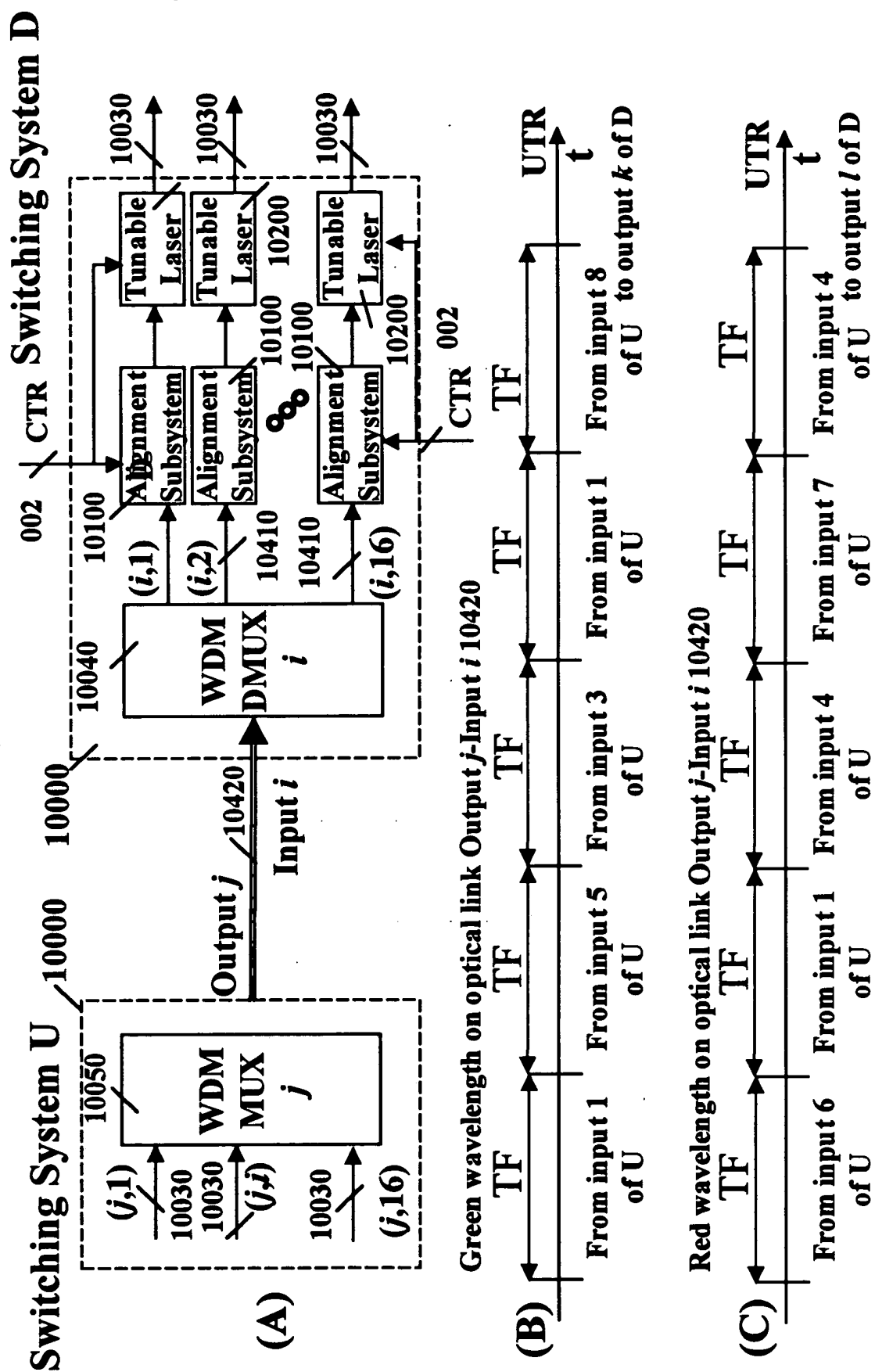


FIG. 8

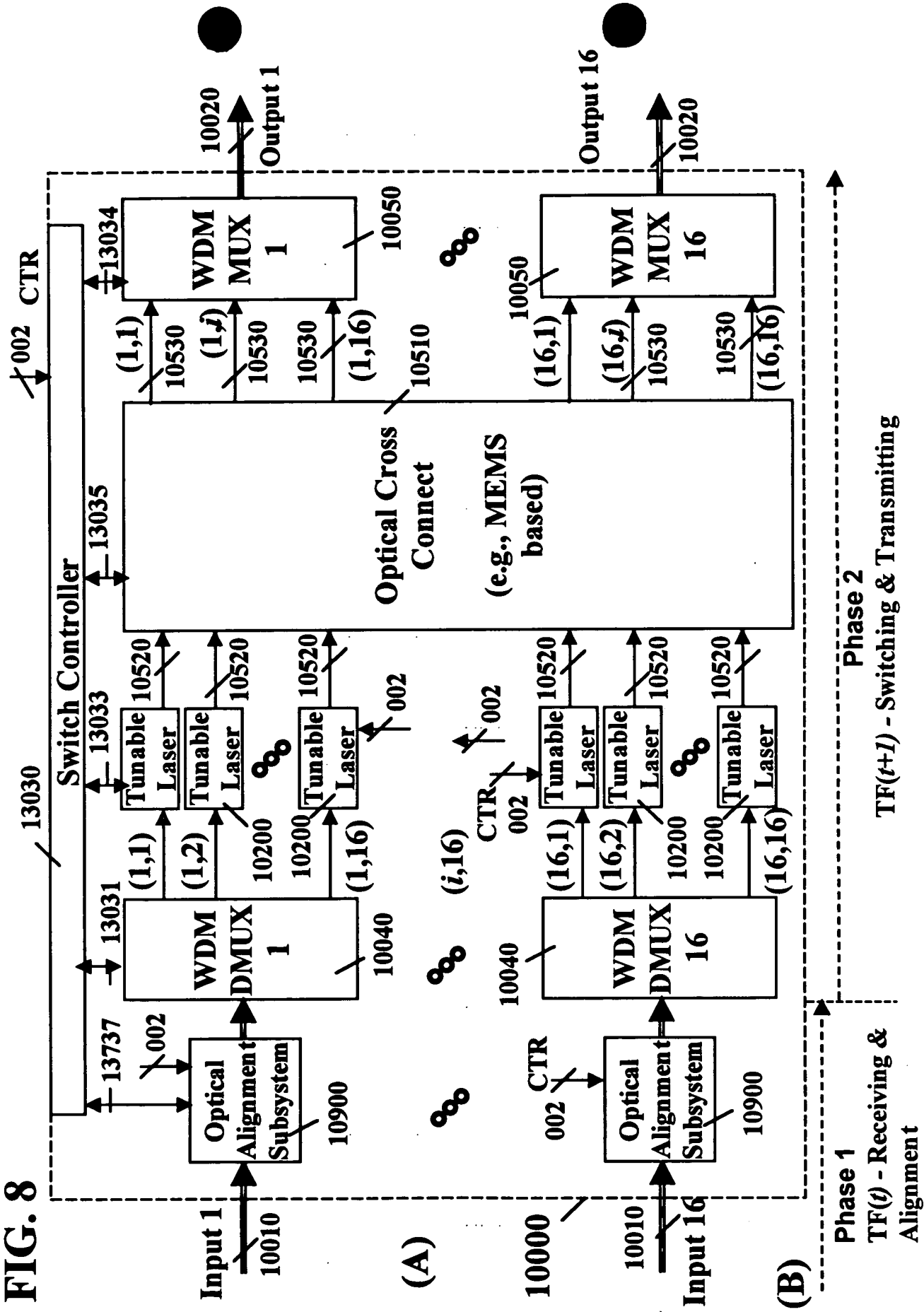


FIG. 9

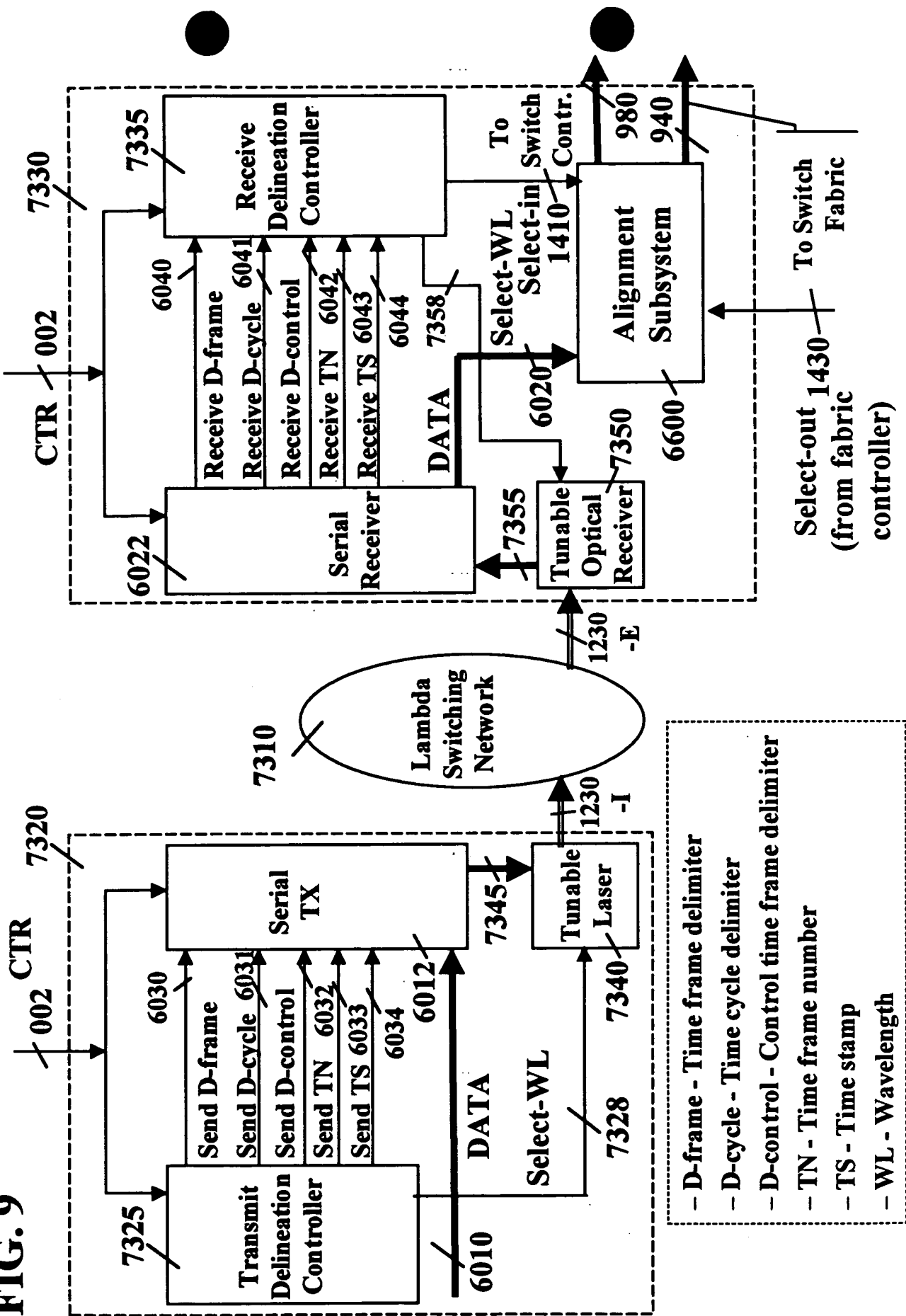


FIG. 10

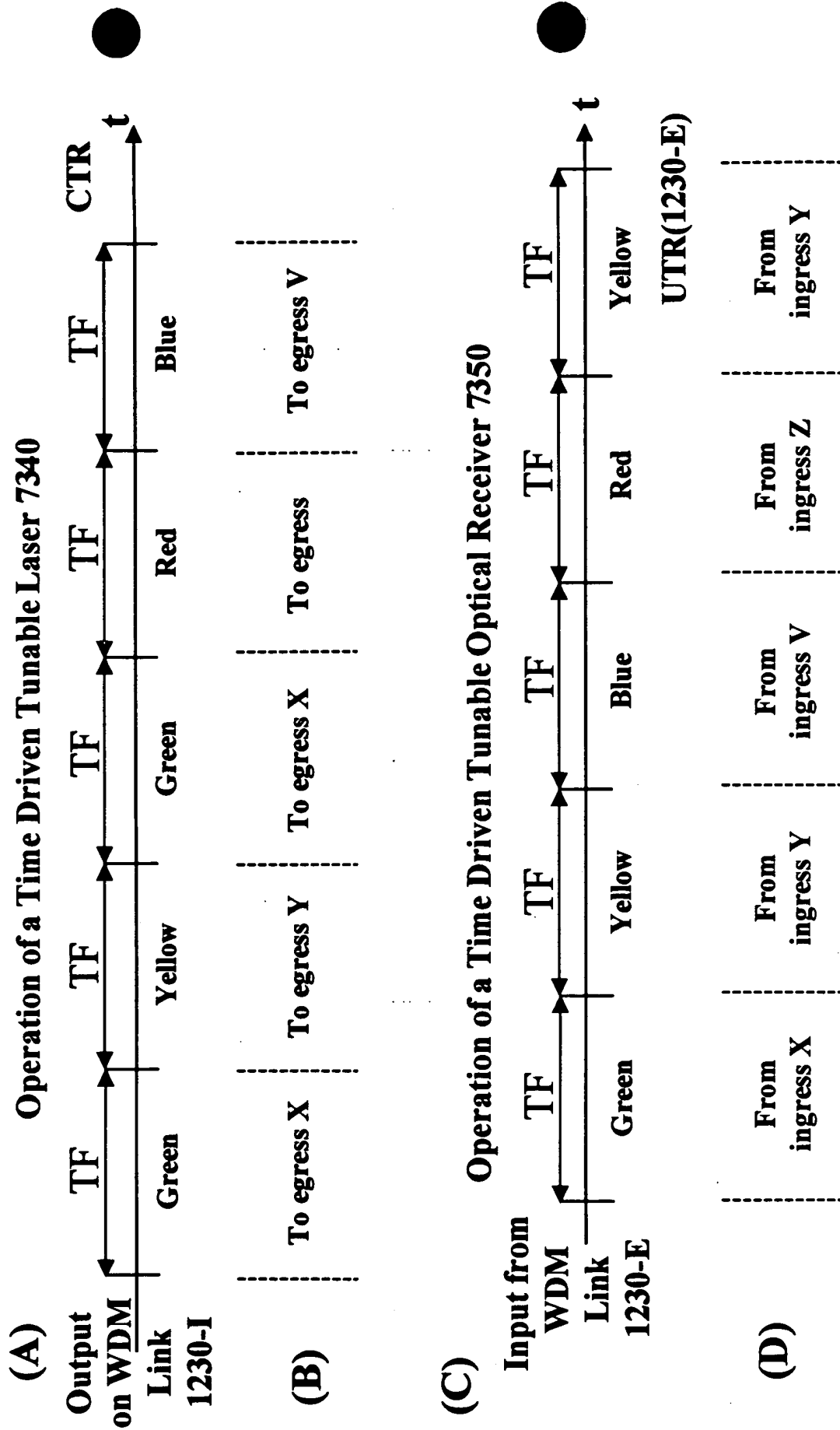


FIG. 11

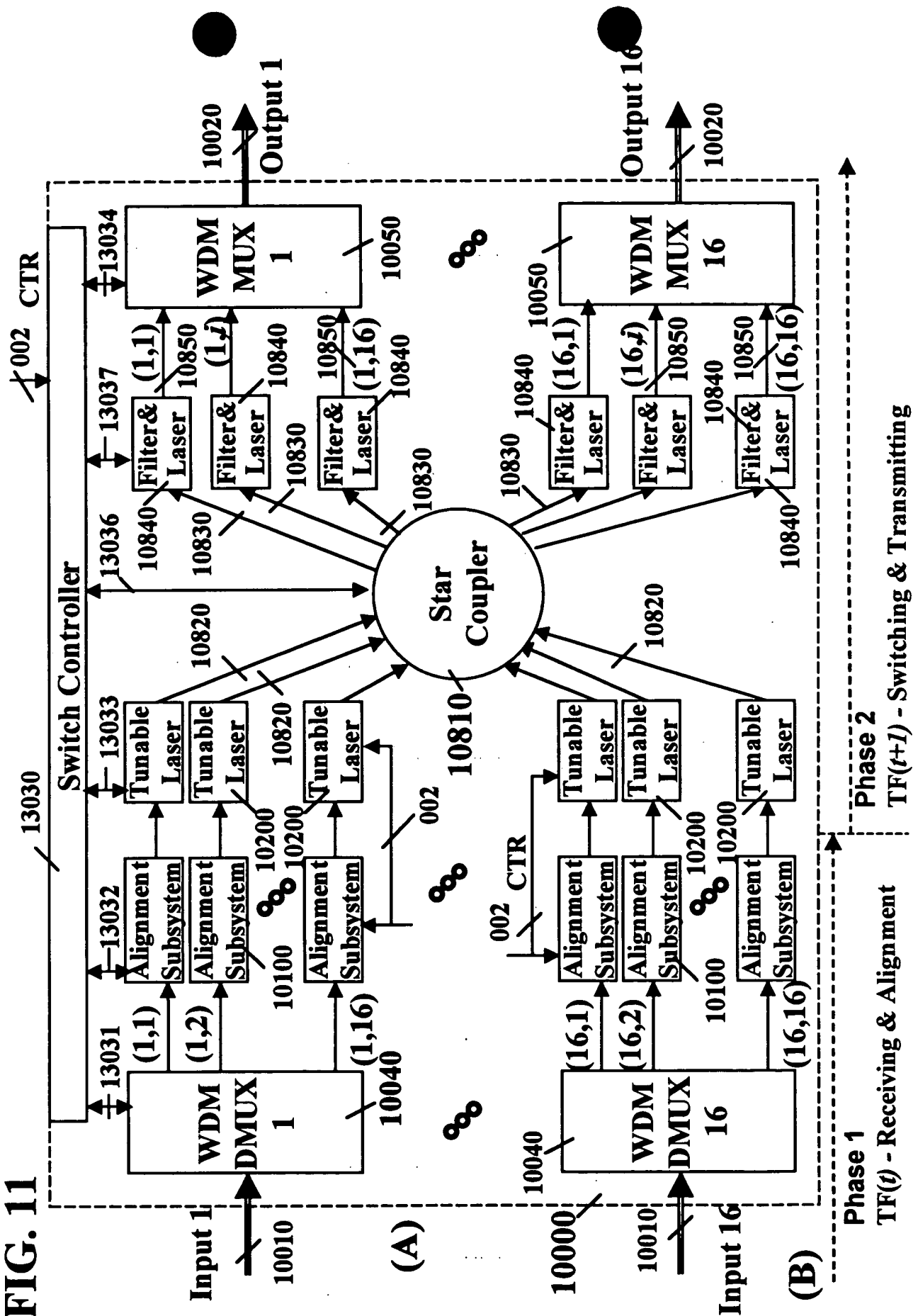
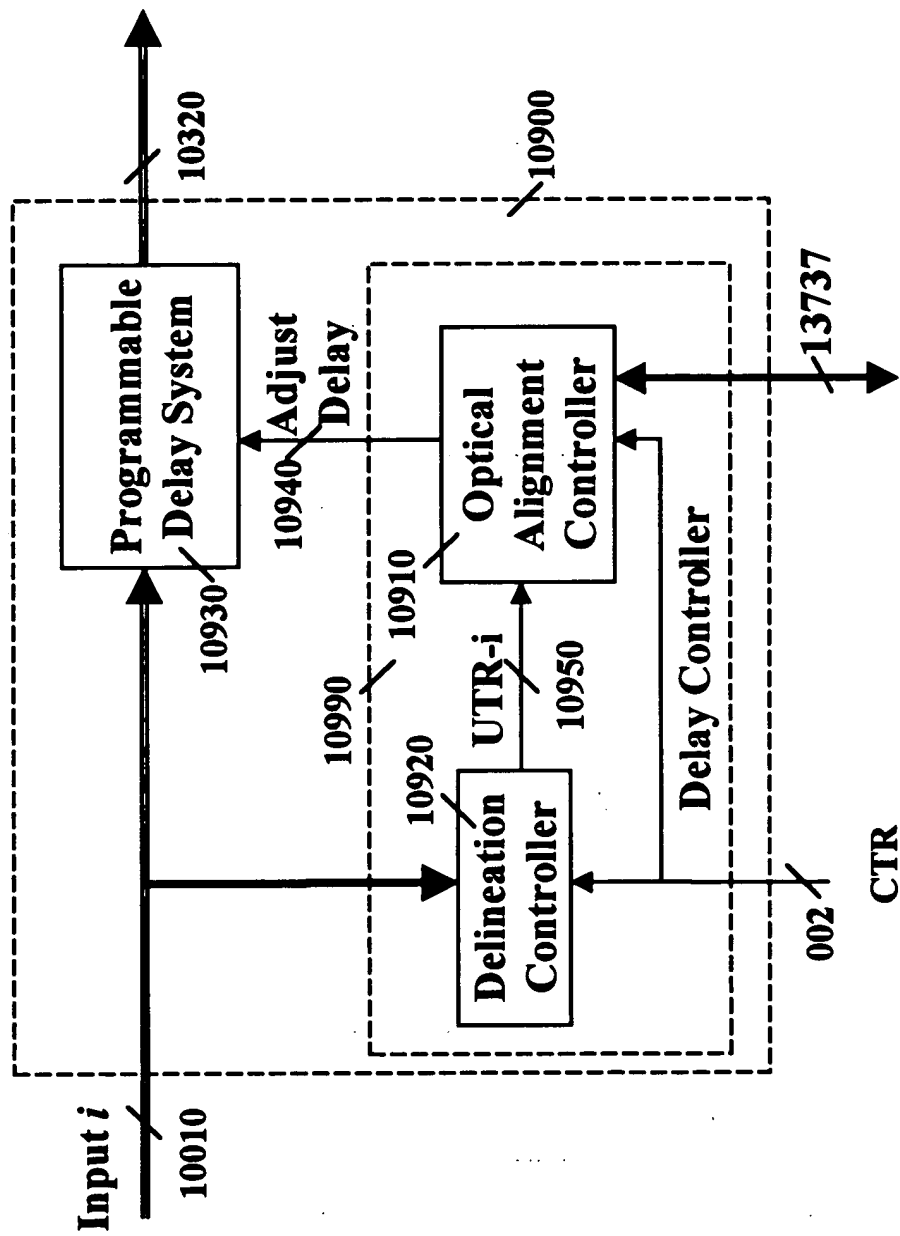


FIG. 12



UTR-i: Unique Time Reference of input link *i*
 CTR: Common Time Reference

FIG. 13

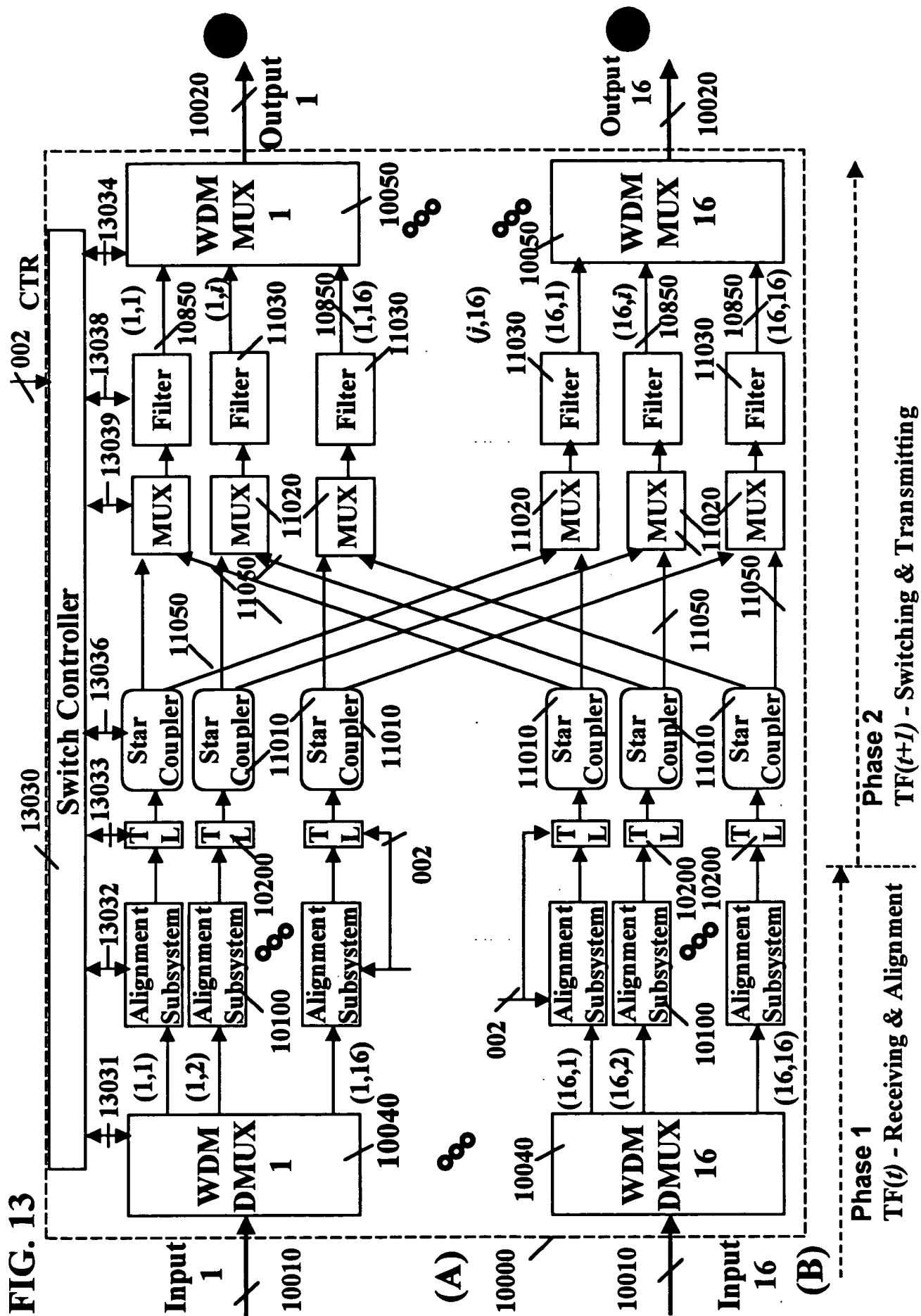


FIG. 14

The diagram illustrates a 16x16 optical switch architecture. It features 16 input channels (Input 1 to Input 16) and 16 output channels (Output 1 to Output 16). Each input channel includes an Optical Alignment Subsystem (10900) and a Star Coupler (13010). The Star Coupler 1 has two WLC Subsystems (13040) with outputs (1,1) and (1,j). The Star Coupler 16 has two WLC Subsystems (13040) with outputs (16,1) and (16,j). These outputs are connected to an Optical Interconnection Subsystem (13020). The Optical Interconnection Subsystem is also connected to 16 WDMs (13030) and 16 WLC Subsystems (13040). The WDMs are connected to the WLC Subsystems, which then connect to the Star Couplers. The Star Couplers are connected to the Optical Alignment Subsystems, which output to the final Output 1 to Output 16. A Switch Controller (13030) is connected to the WDMs and the Star Couplers. Various reference numerals are used throughout the diagram to identify components and connections.

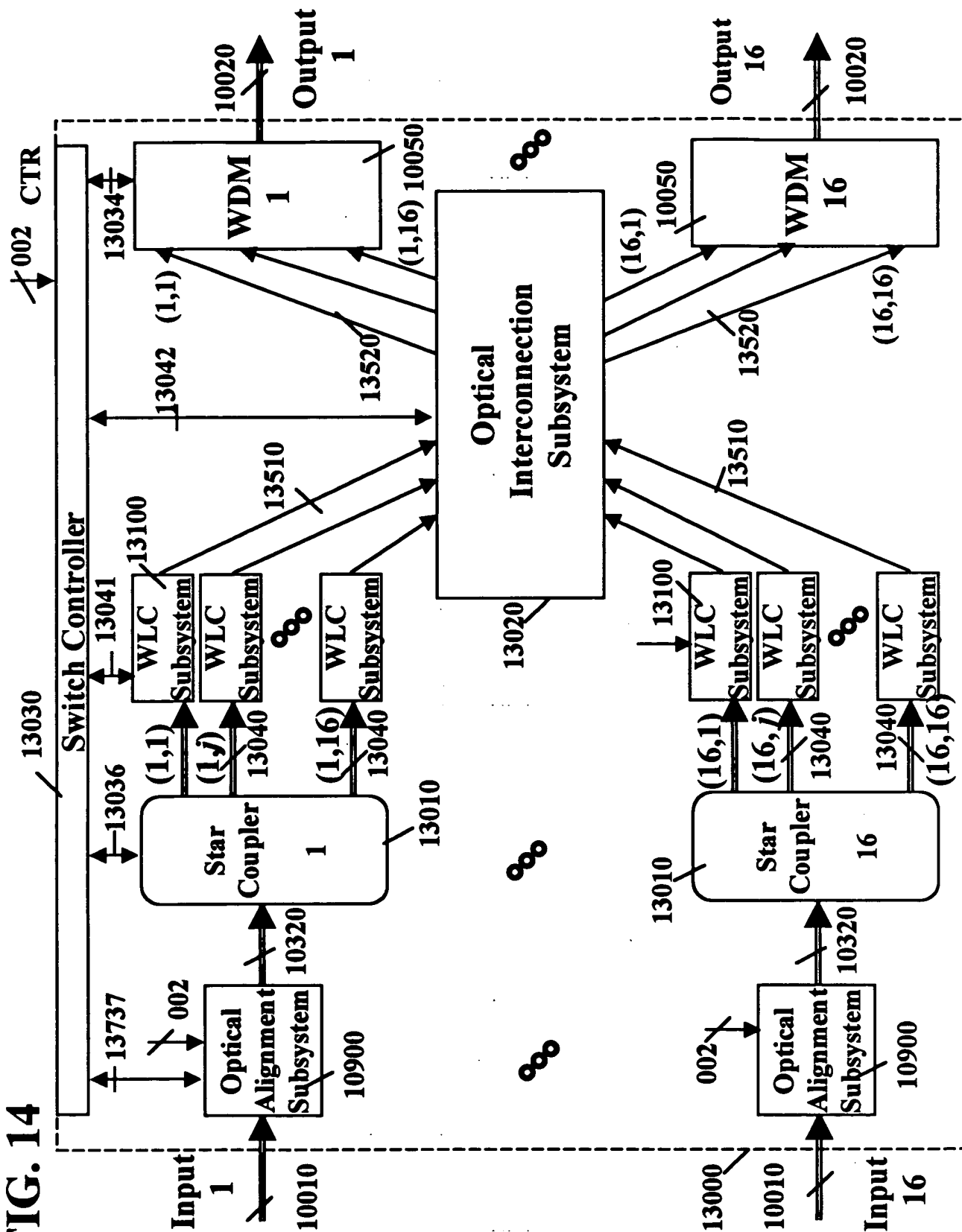
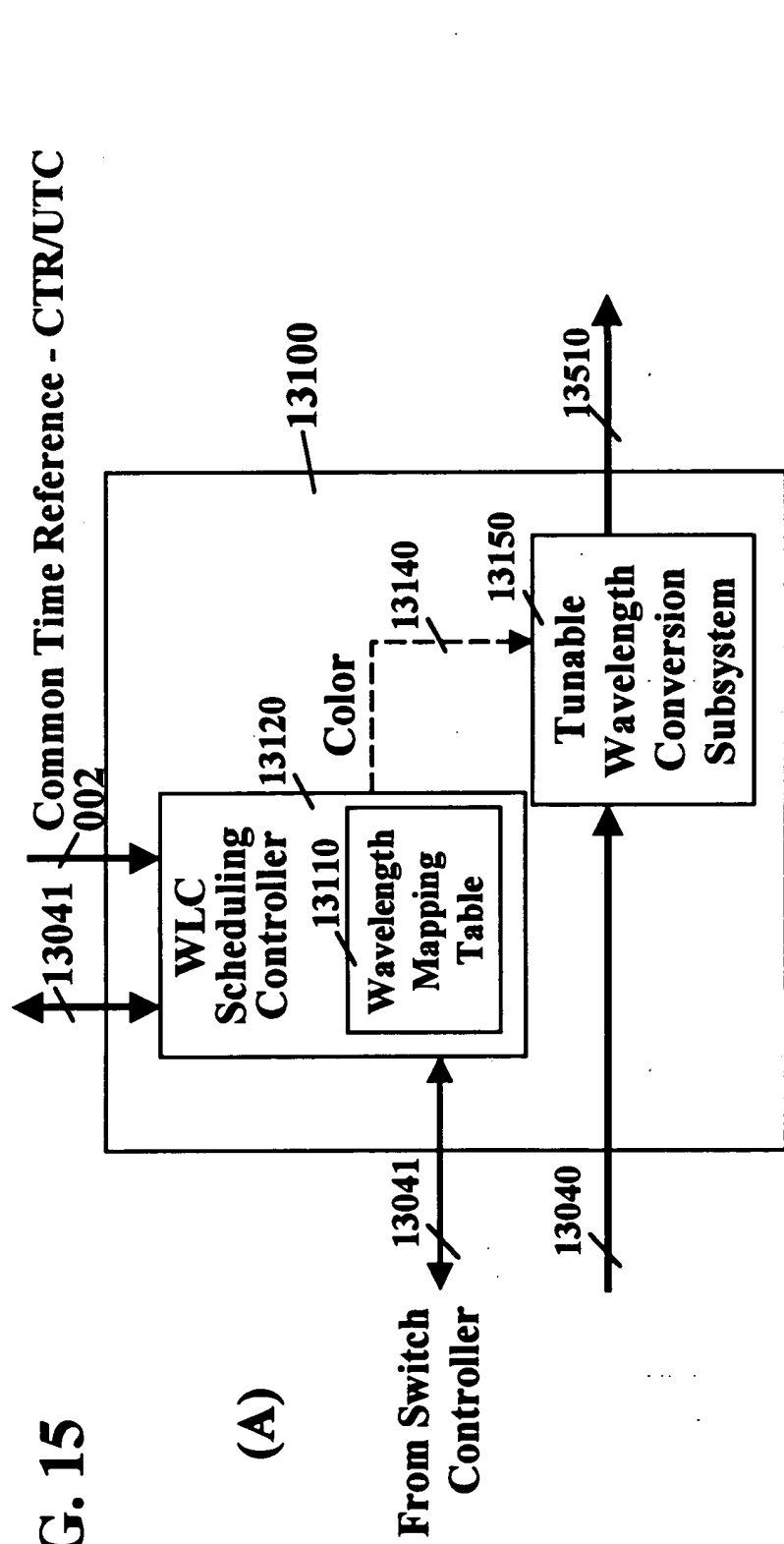
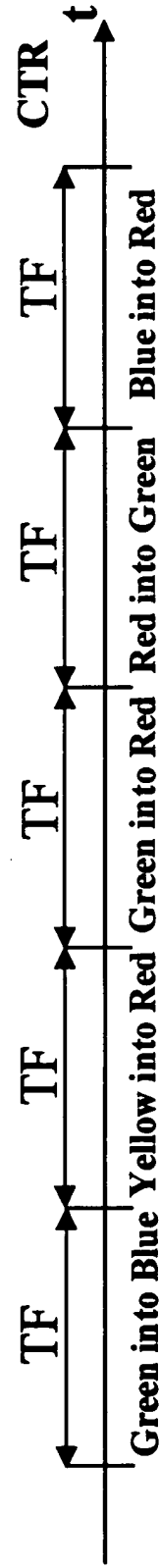


FIG. 15



(B)

Operation of a Time Driven Tunable Wavelength Conversion Subsystem 13150



Wavelengths received 13040 and emitted 13510 by
 Tunable Wavelength Conversion Subsystem 13150

FIG. 16

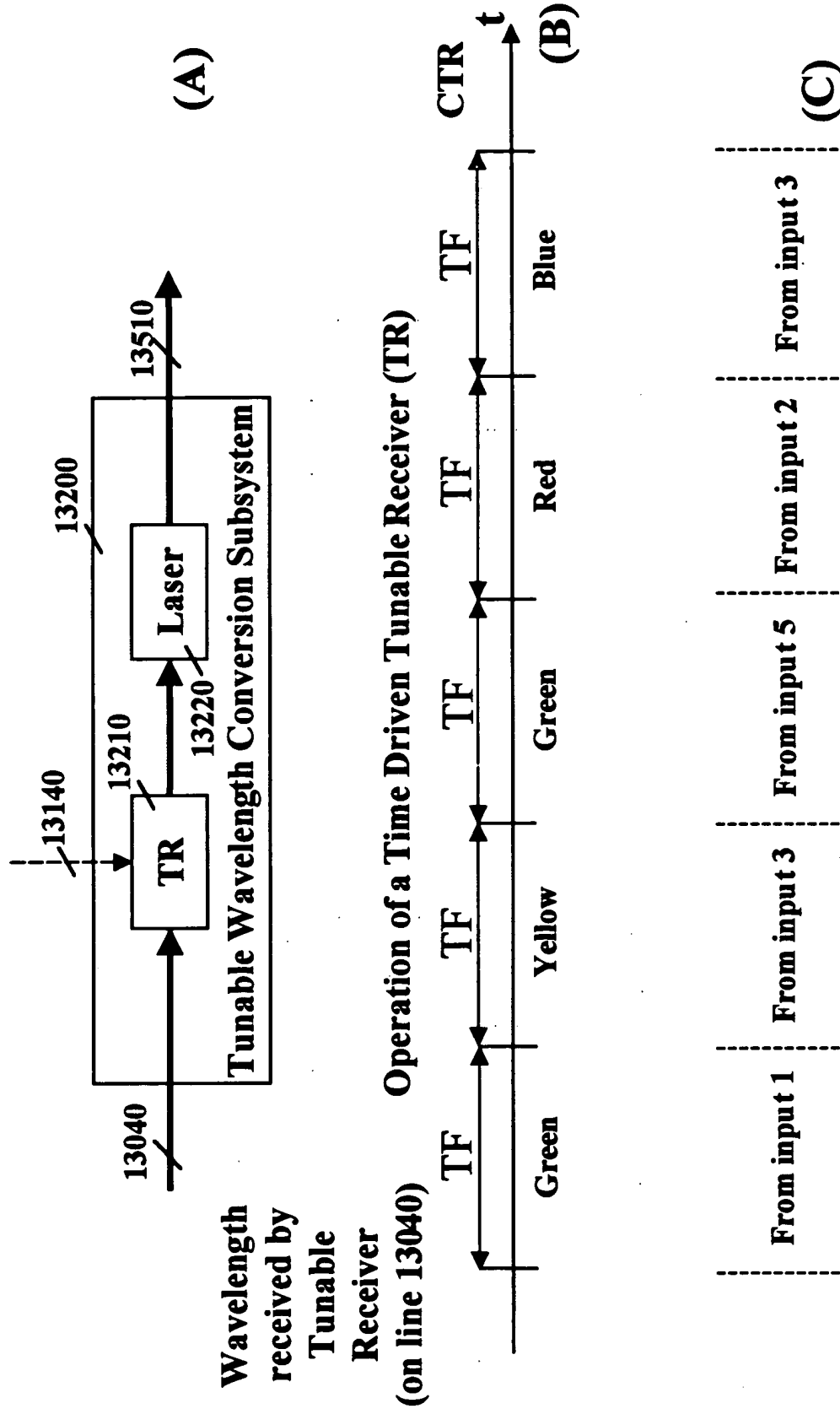


FIG. 17

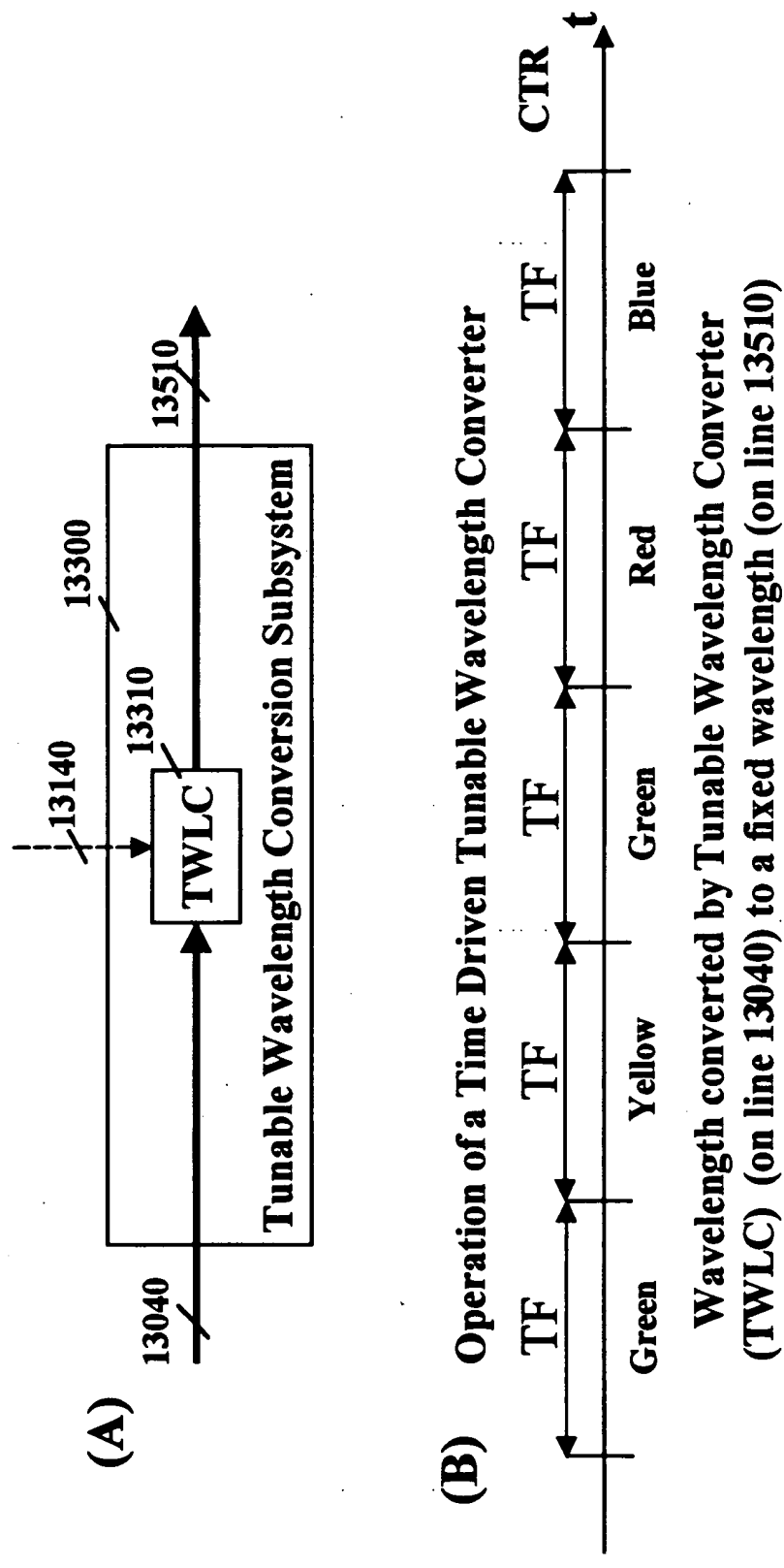
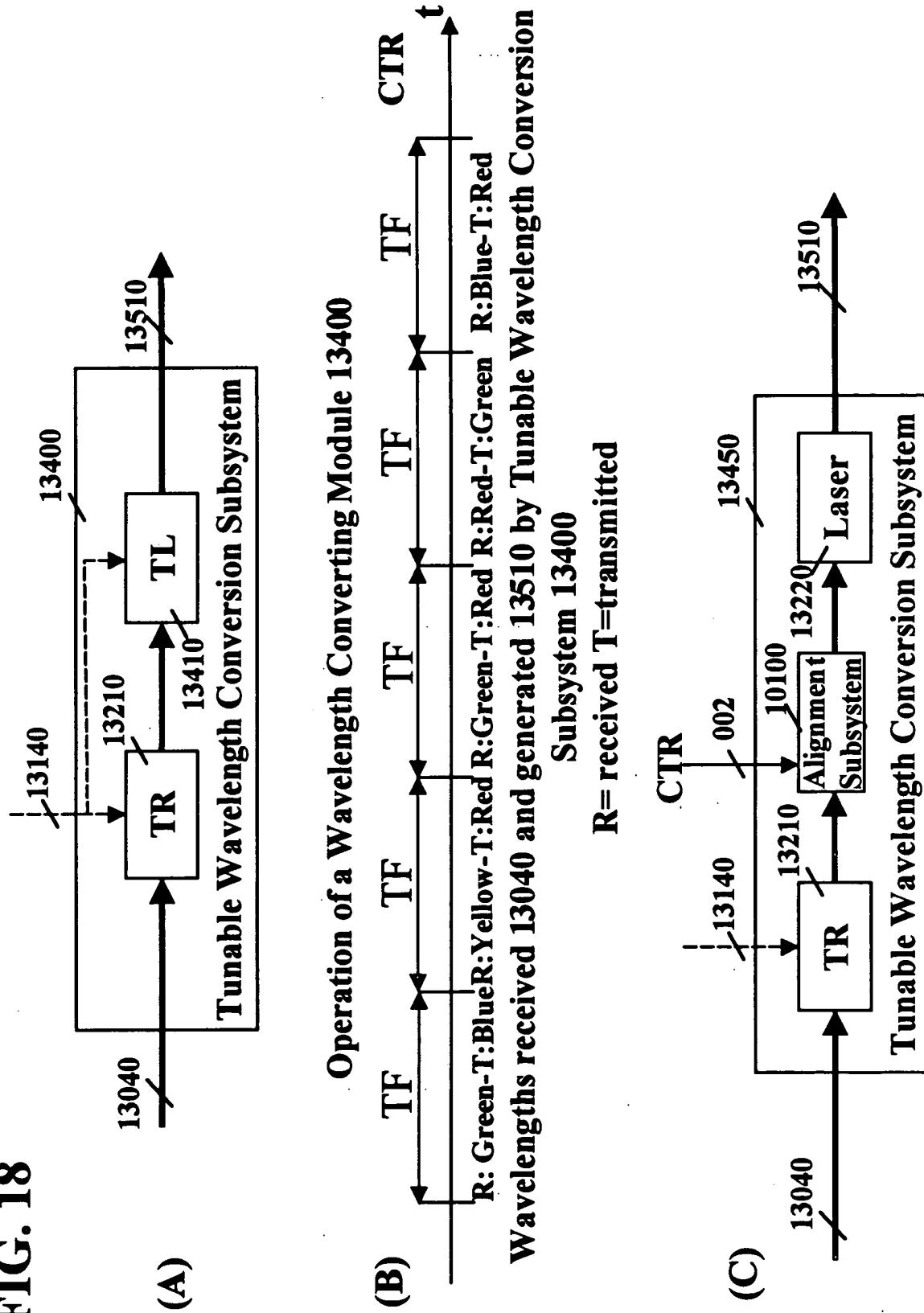
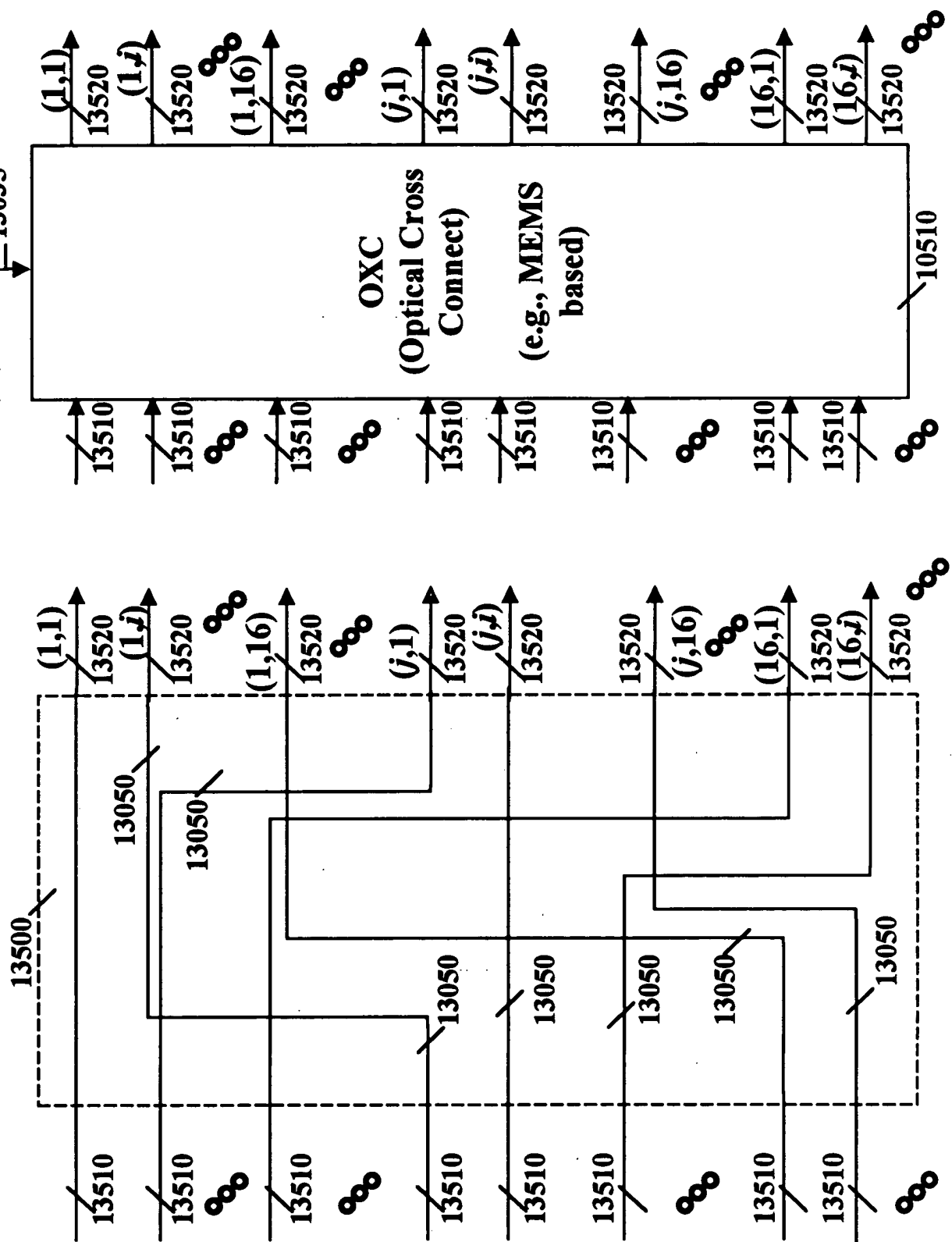


FIG. 18



(A)



(B)

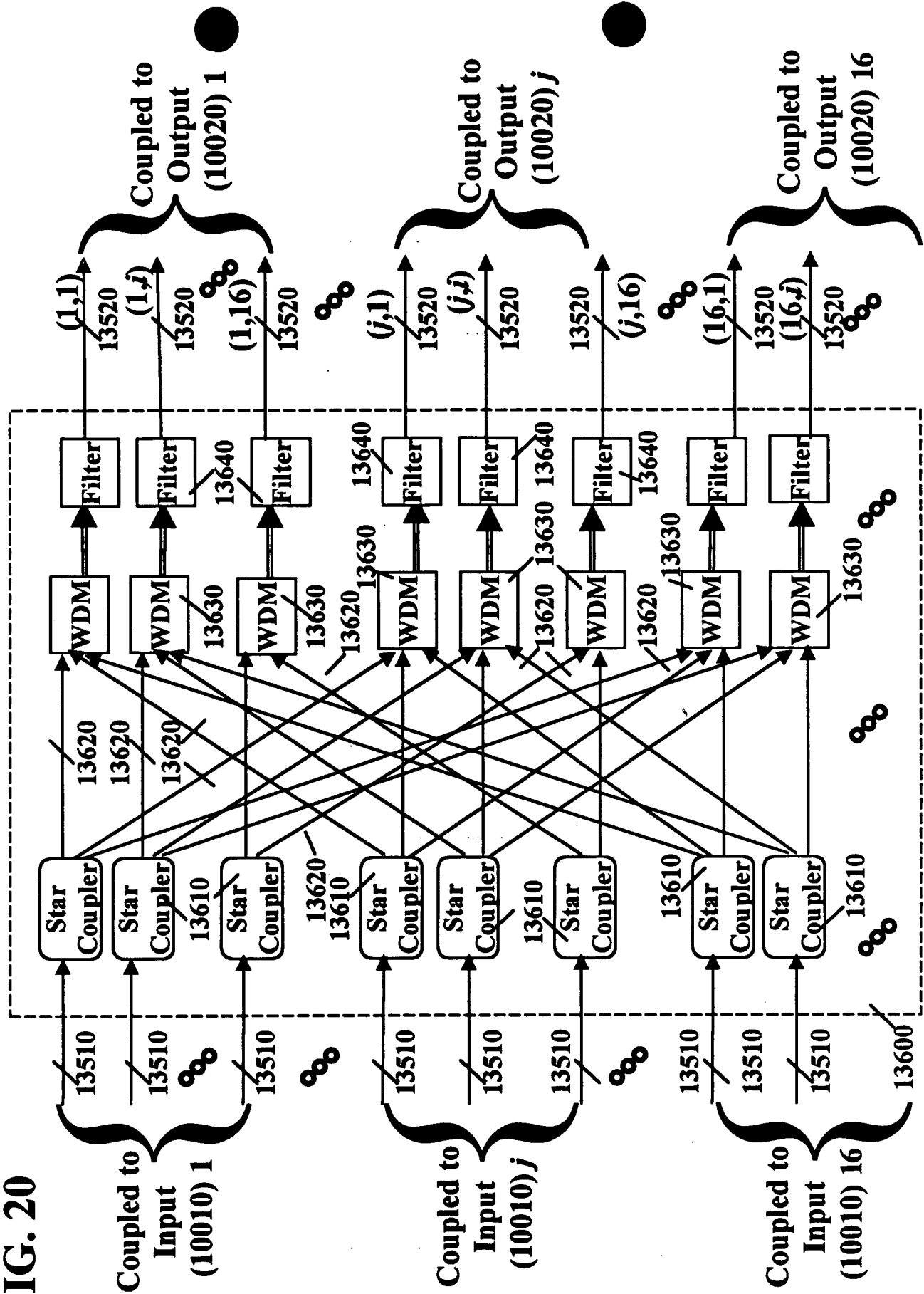
13035

**OXC
(Optical Cross
Connect)**

**(e.g., MEMS
based)**

10510

FIG. 20



CTR

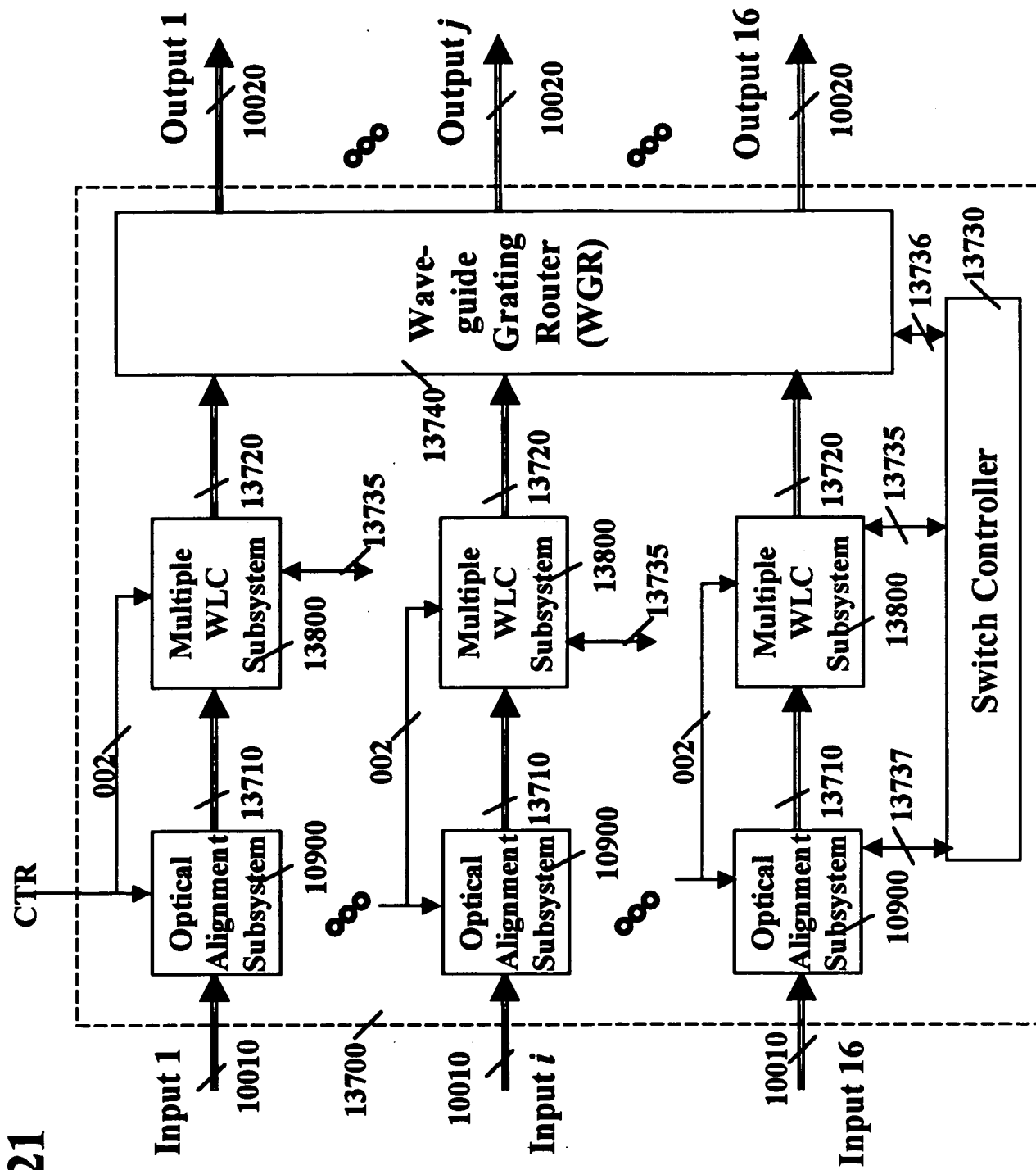


FIG. 22

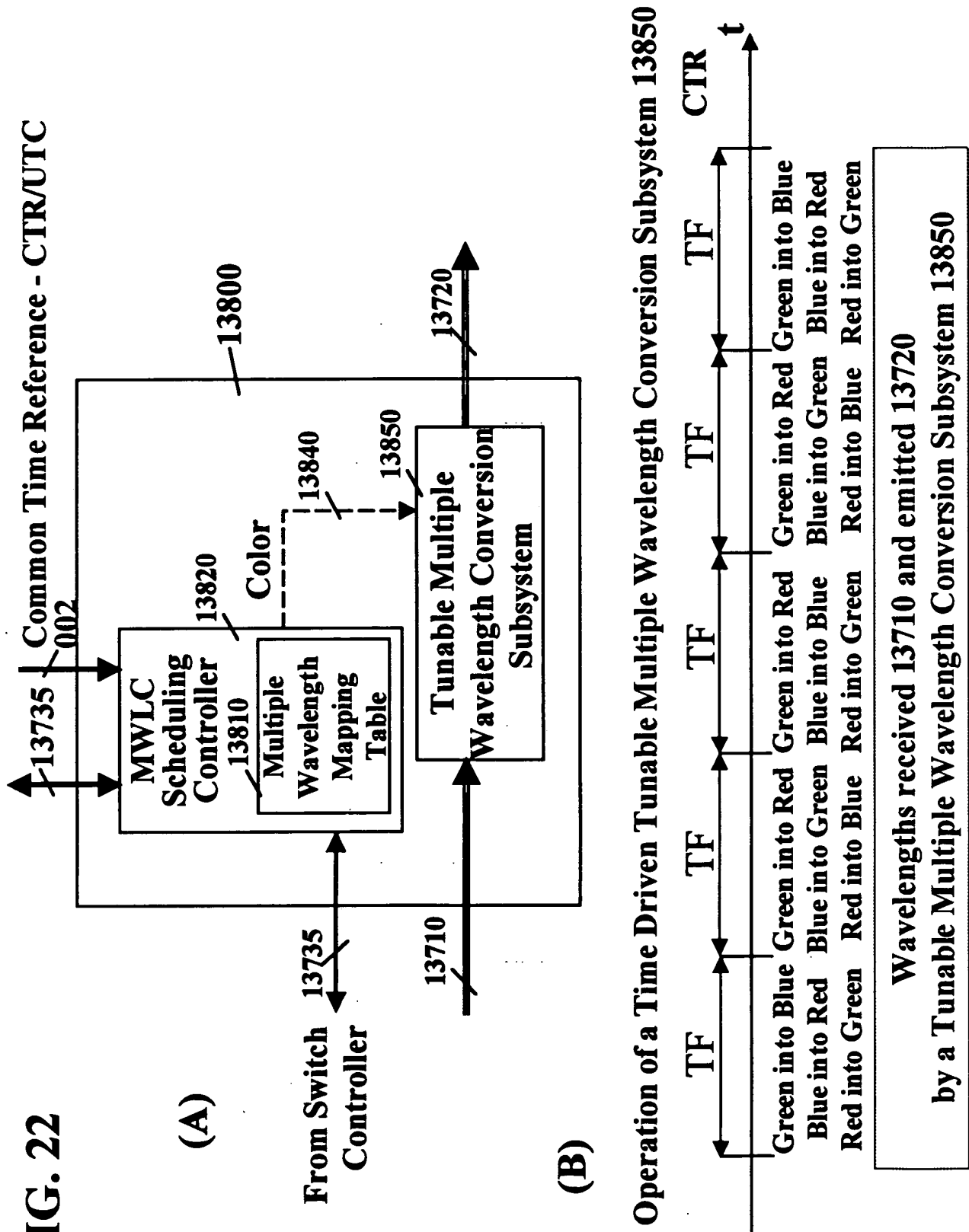


FIG. 23

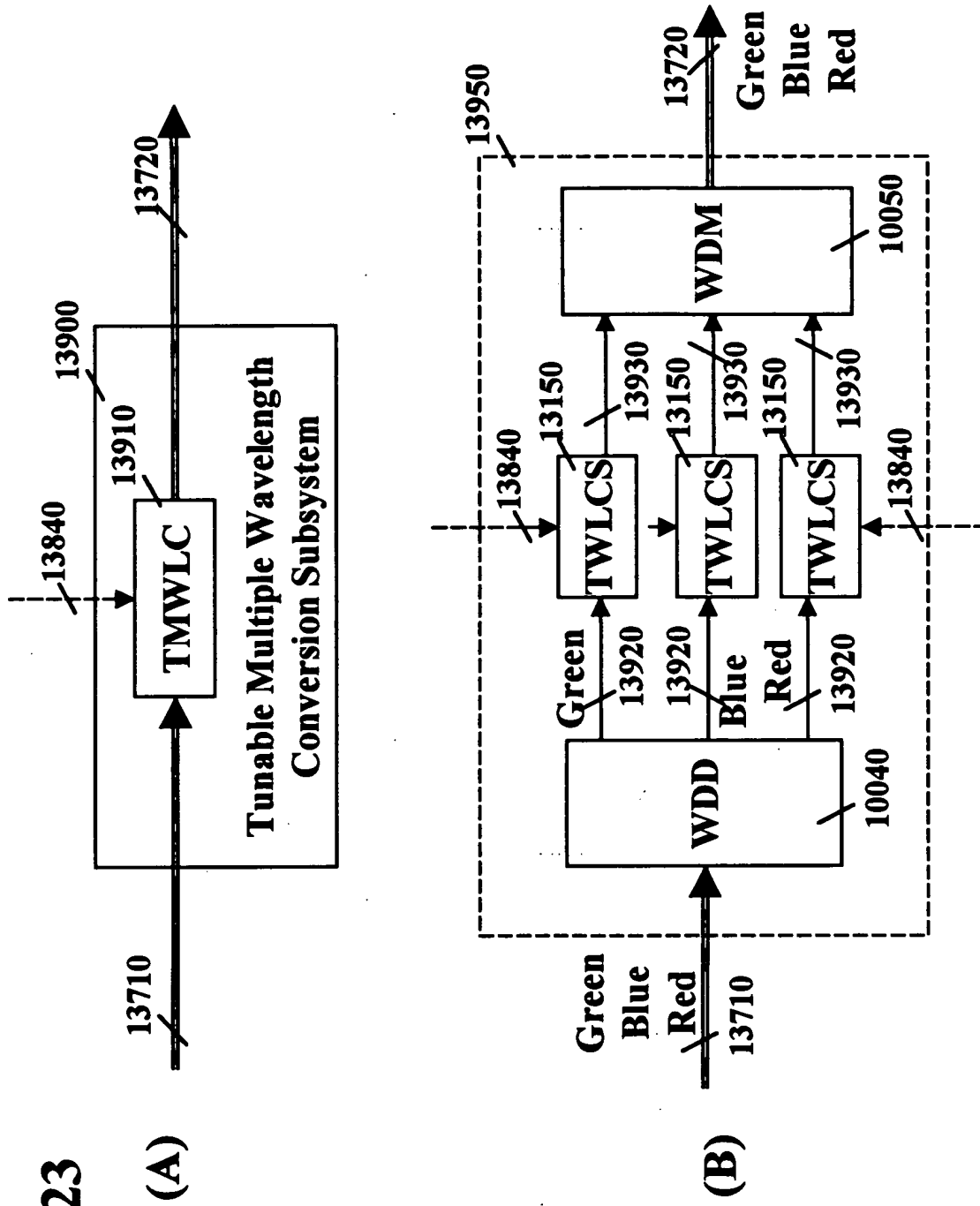


FIG. 24

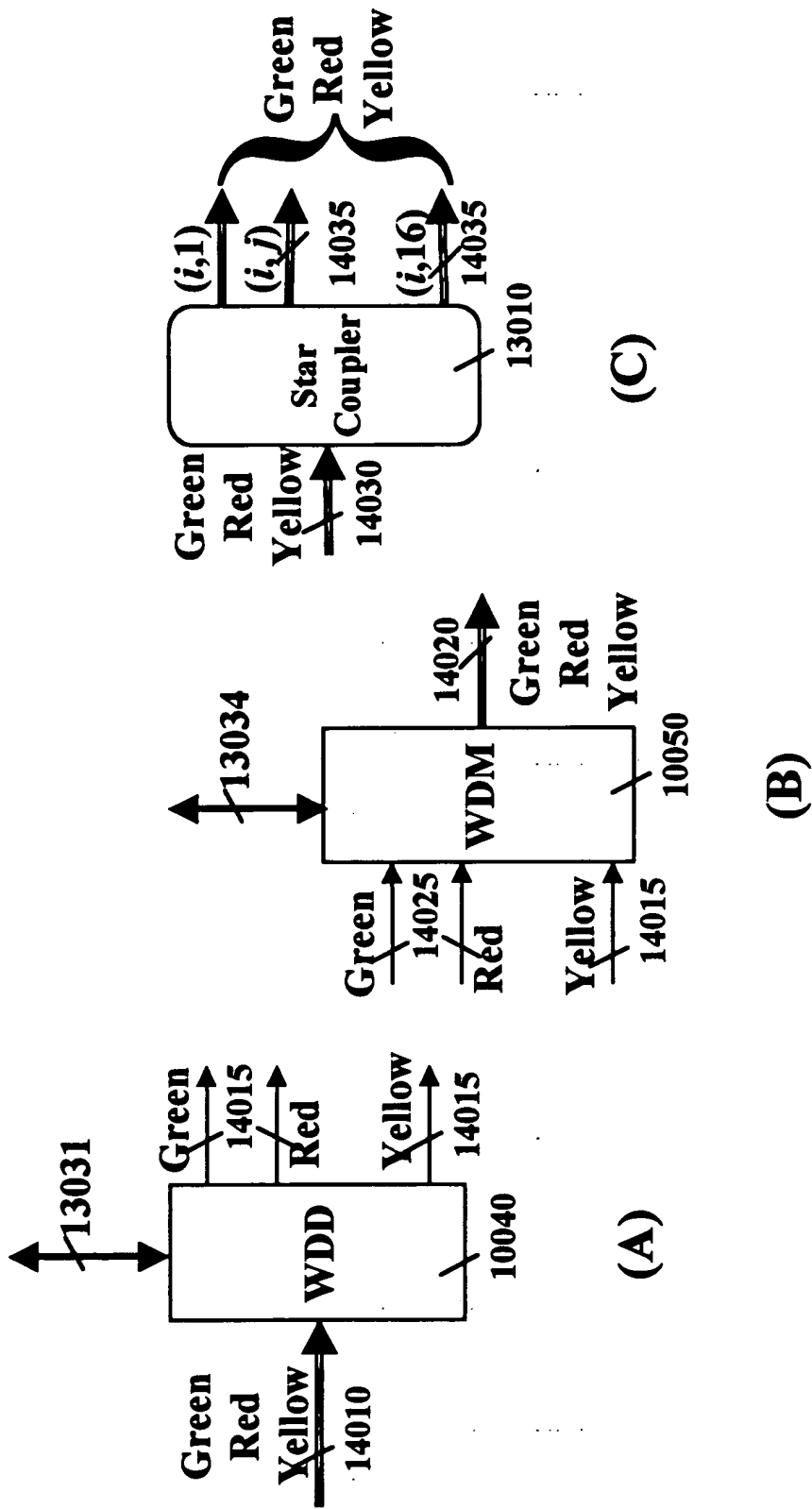


FIG. 25

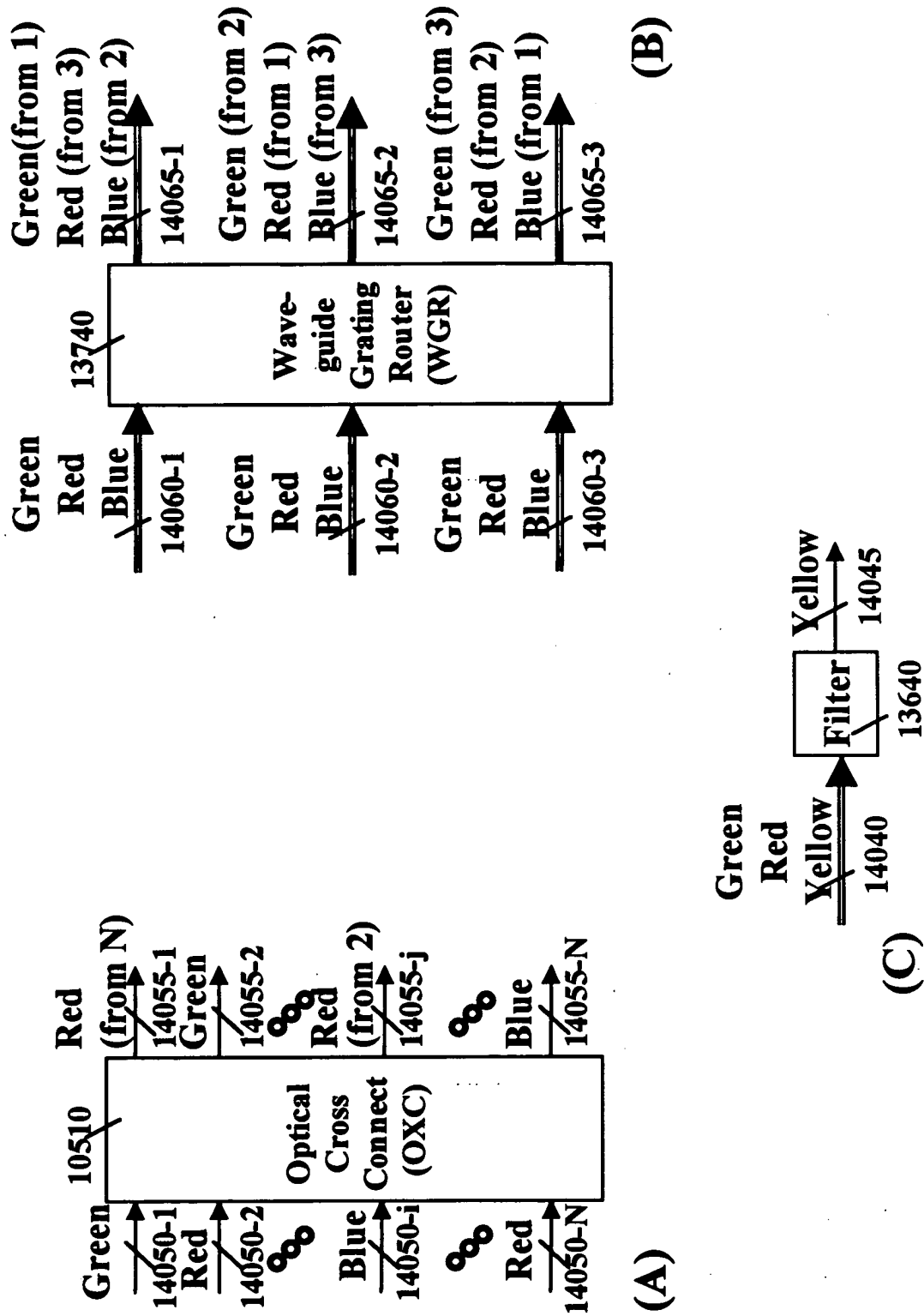


FIG. 26

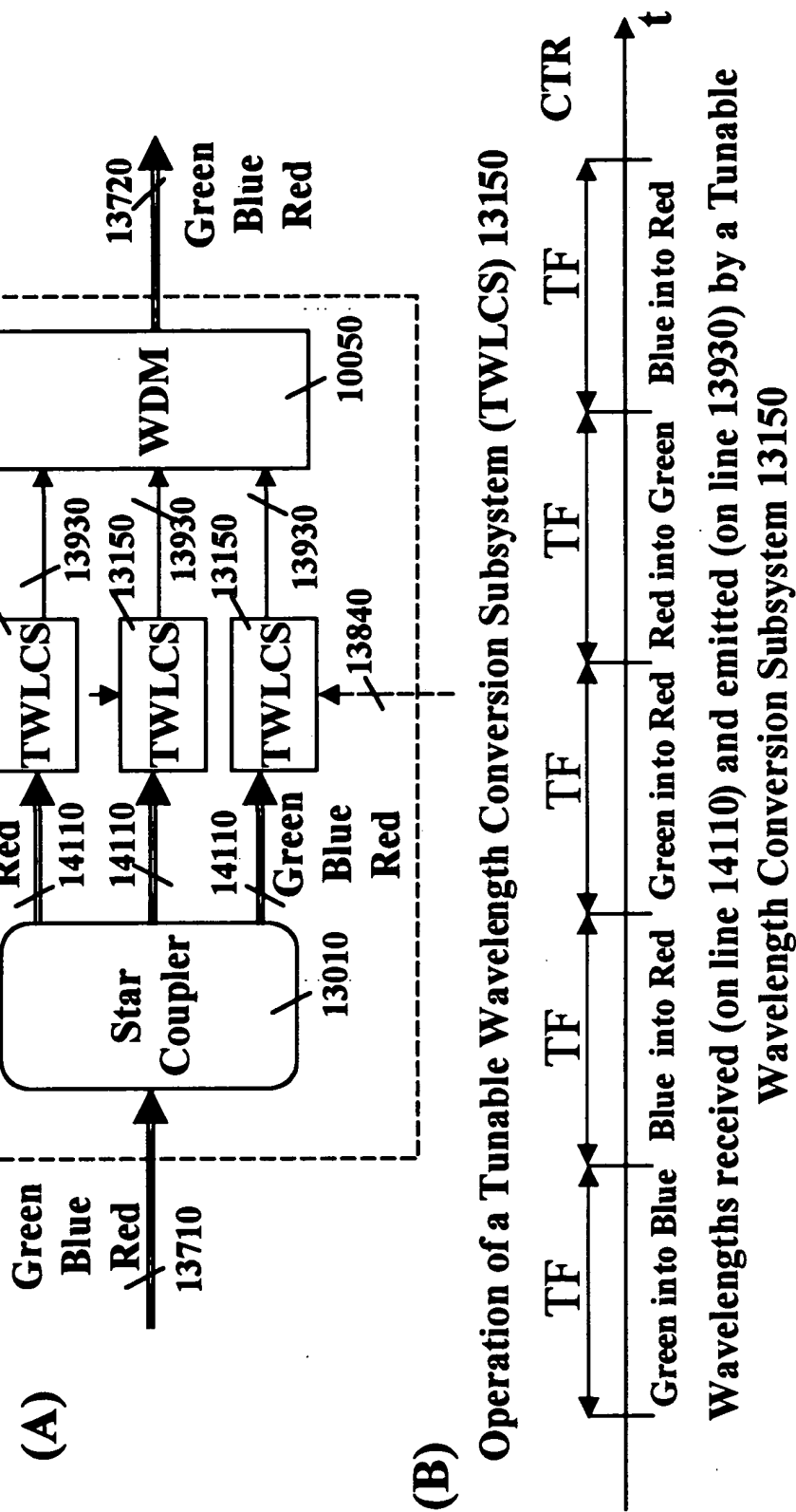


FIG. 27

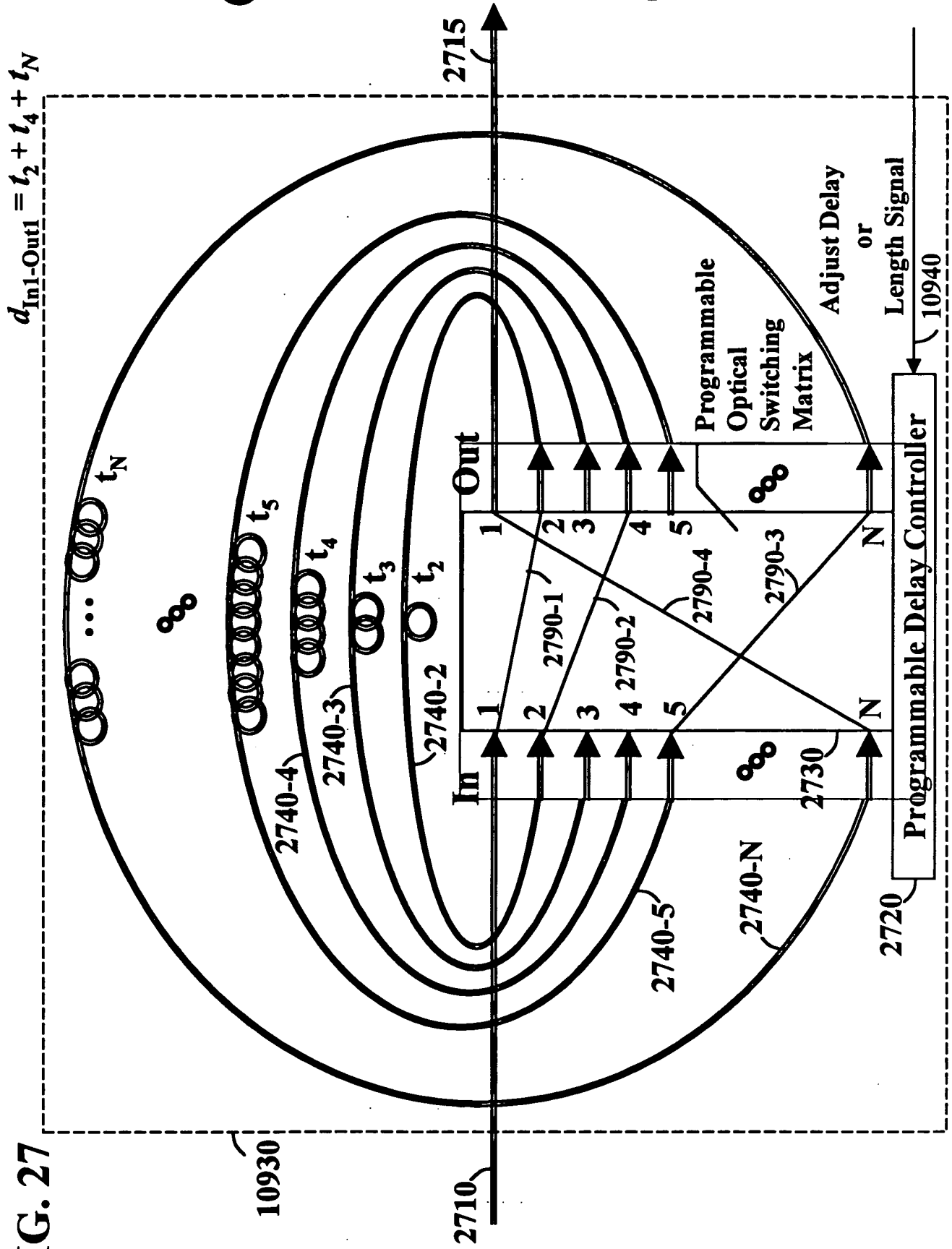
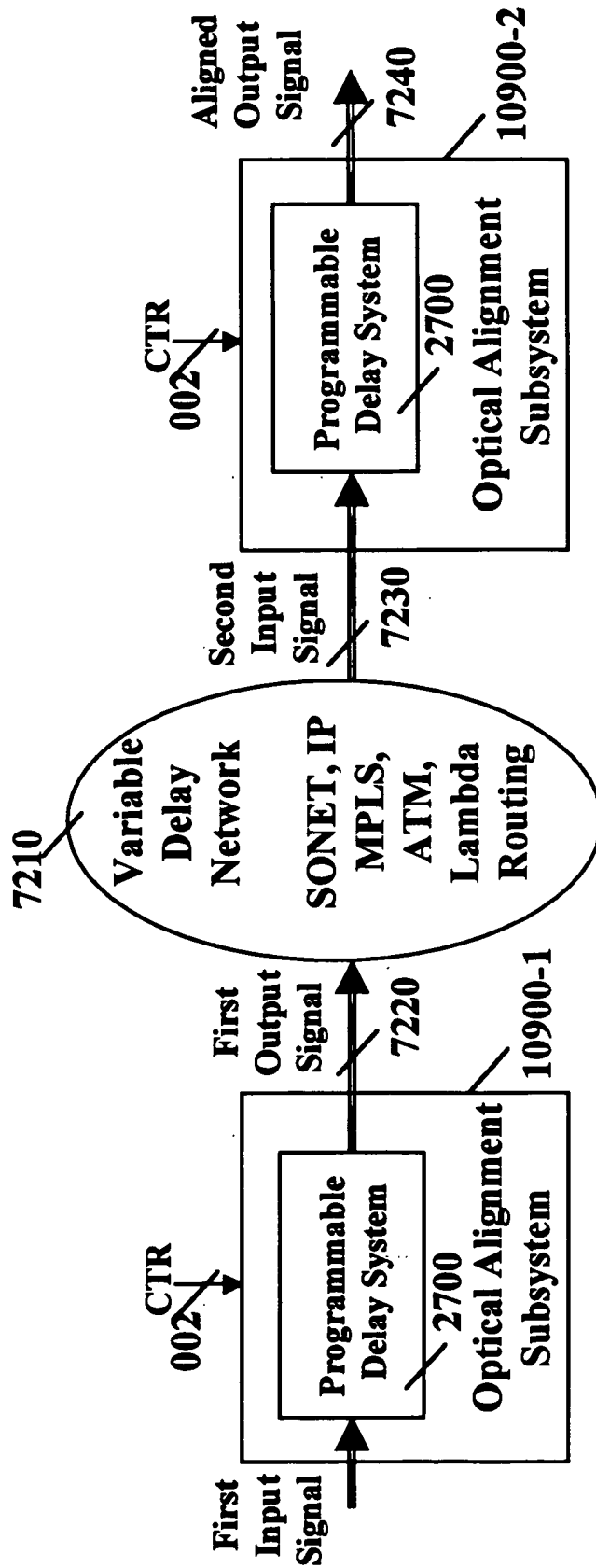


FIG. 28



Delay between the output of the 2 programmable delay lines is integer number of time frames

FIG. 29

TF Alignment of UTR(i) to UTC - with three input queues - principle of operation:

The same queue is not used simultaneously for:

1. Receiving data packets from the serial link, and
2. Forwarding data packets to the switch

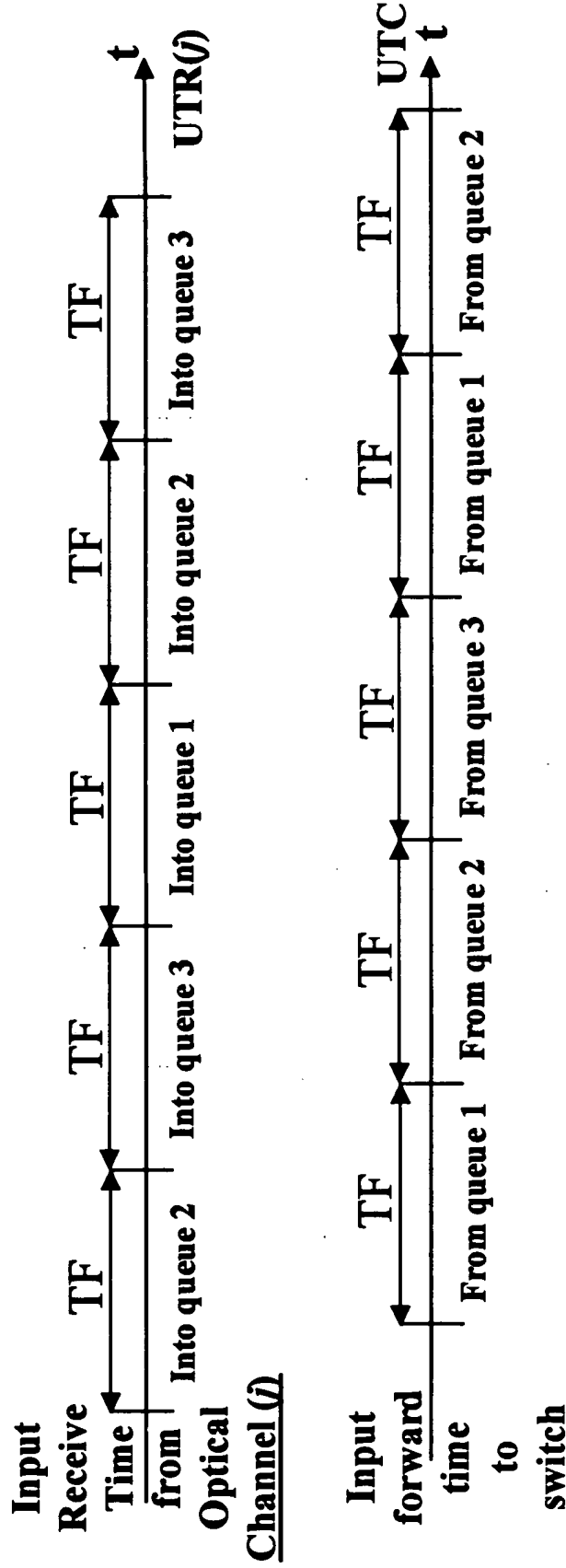


FIG. 30

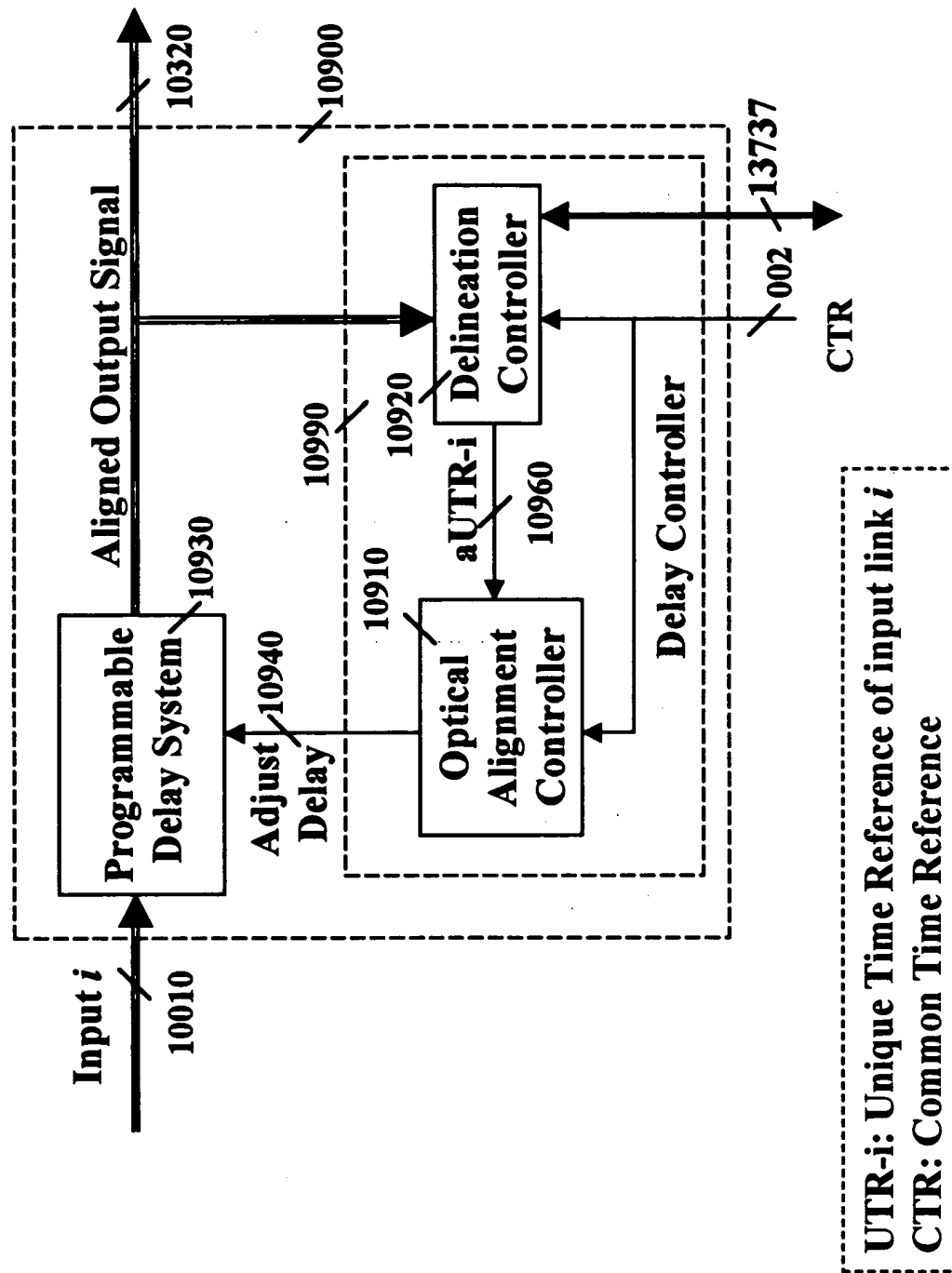


FIG. 31

POSM: Programmable Optical Switching Matrix

$$d_{In1-Out1} = t_1 + 2 \cdot t_2 + 3 \cdot t_N$$

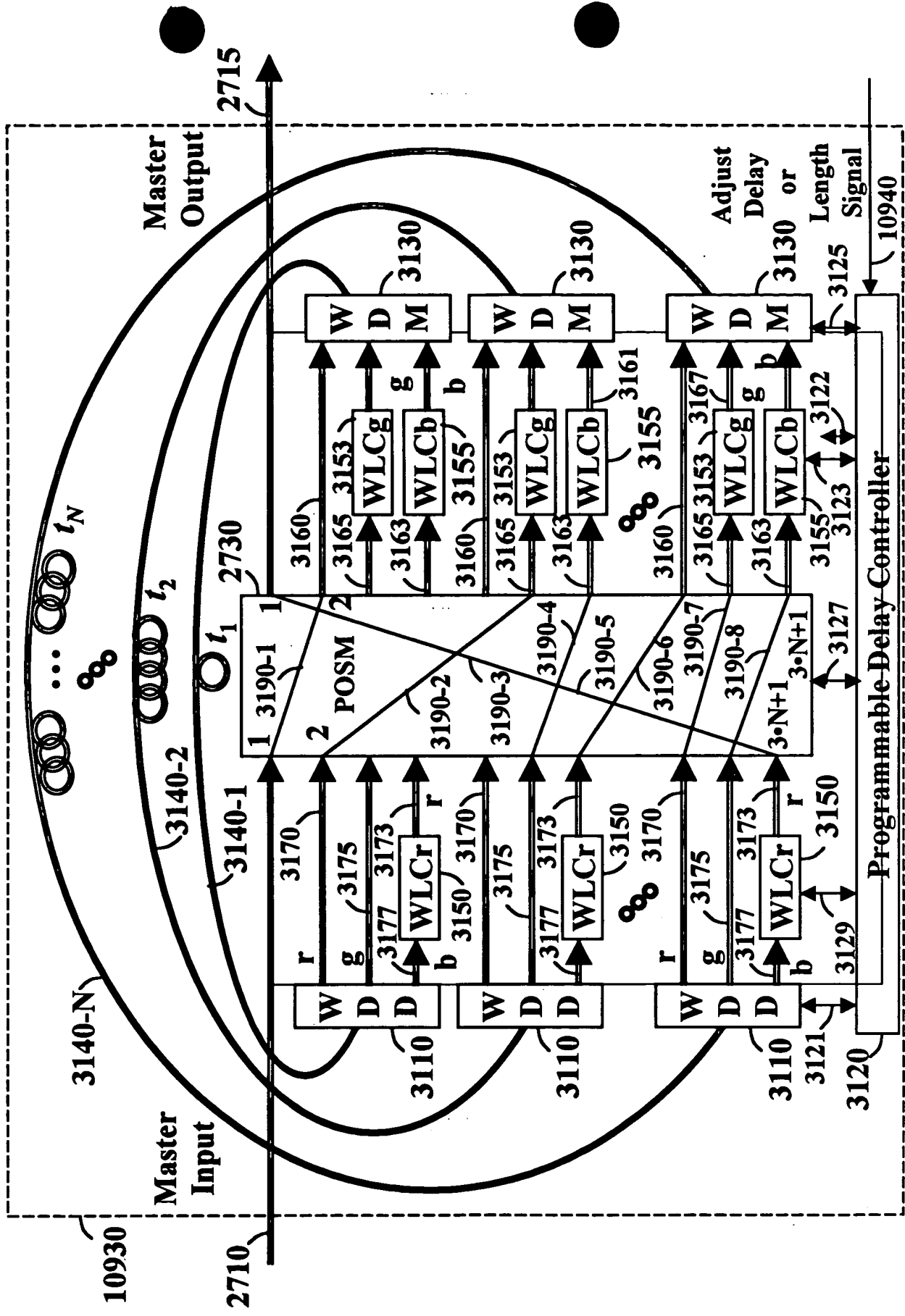


FIG. 32

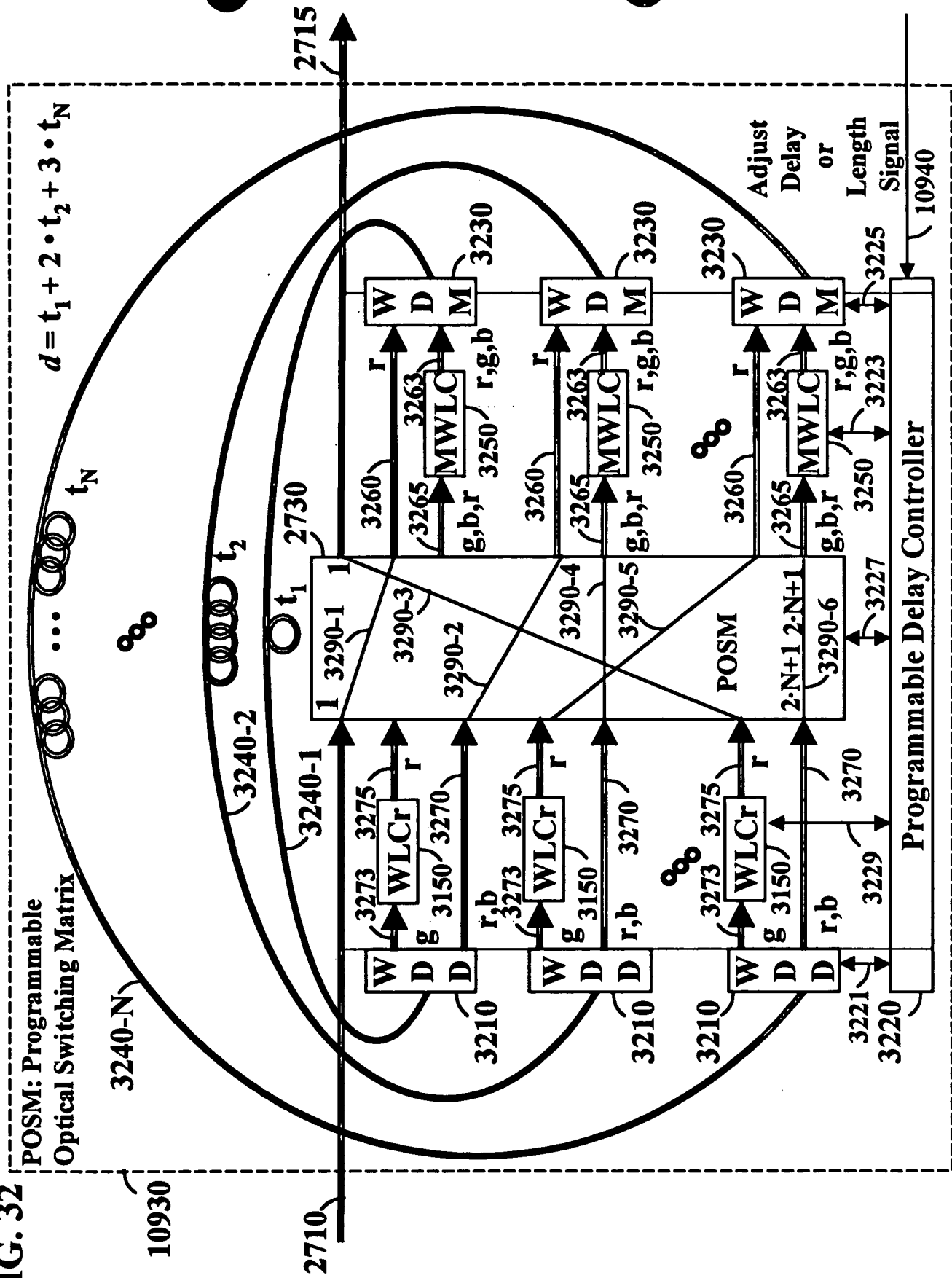
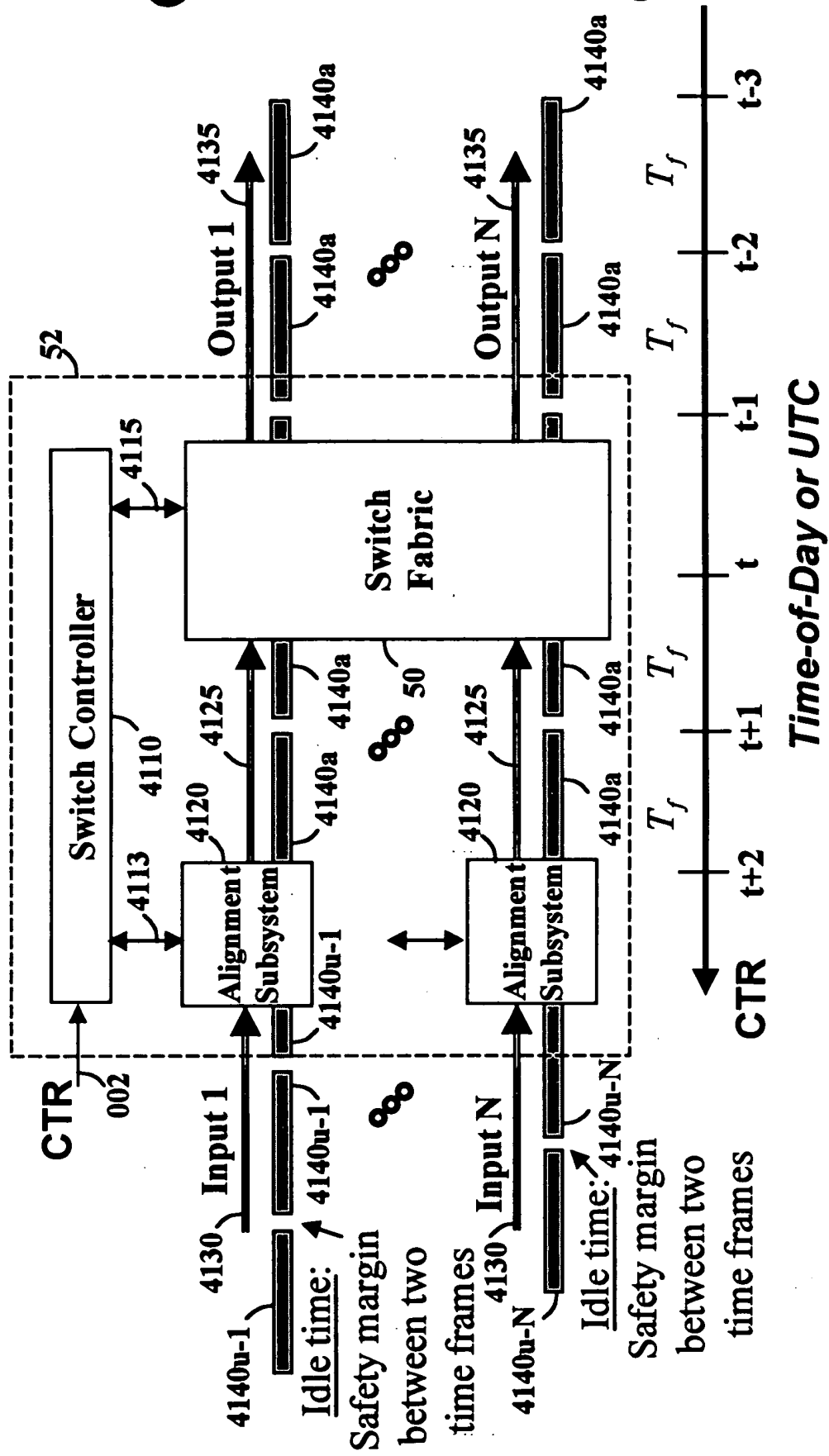


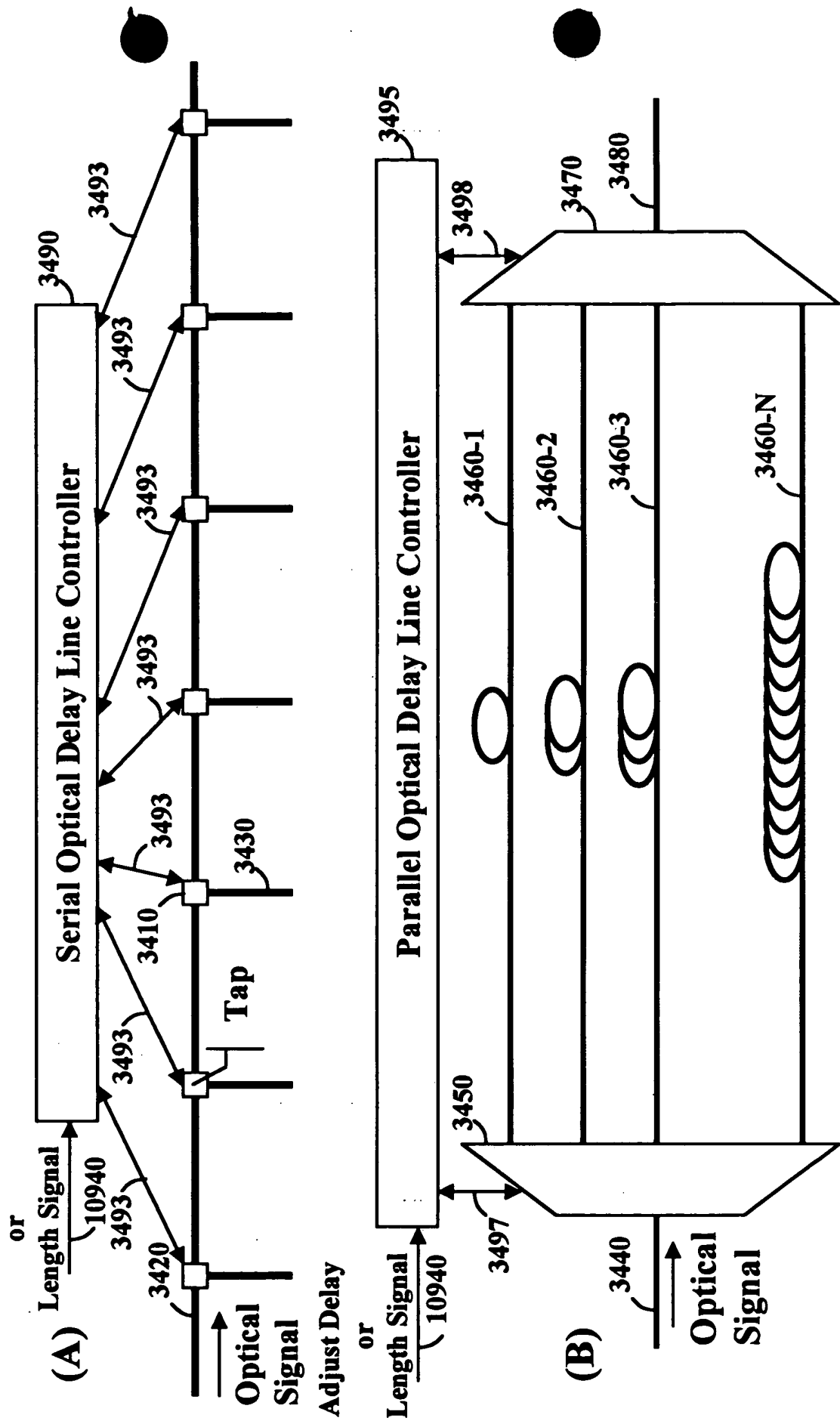
FIG. 33



4140 T_f : Time frame

4140 : Time frame payload – with a predefined number of data units

Adjust Delay



POWSM: Programmable Optical Wavelength Switching Matrix

